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BY

CHARLES D. MEIGS, M.D.,

PROFESSOR OF MIDWIFERY AND THE DISEASES OF WOMEN AND CHILDREN IN JEFFERSON MEDICAL
COLLEGE AT PHILADELPHIA; LATELY ONE OF THE PHYSICIANS TO THE LYING-IN DEPARTMENT
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LONDON; MEMBER OF THE AMERICAN PHILOSOPHICAL SOCIETY; OF
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TO THE

EMINENT WESTERN PHYSICIAN,

PHILOSOPHER,

GENTLEMAN, AND SCHOLAR,

DANIEL DRAKE, M.D.,

OF

CINCINNATI.

PREFACE TO THE THIRD EDITION.

I HAVE endeavored to fulfil the intention expressed in the last paragraph of the preface to the second edition of my work. I trust that my readers will find I have made some amendments in the style, and that I have brought the subject up to the latest dates of real improvements in our art and science.

CHARLES D. MEIGS,
324 *Walnut Street.*

OCTOBER, 1856.

PREFACE TO THE SECOND EDITION.

THE first edition of my work, though a large one, being exhausted, I have now the pleasure to offer to my medical brethren in America, a new one, considerably augmented as to the text, and which I have endeavored to improve by recasting some parts, by cancelling others, and by an earnest attention to improvements in the literary execution of the whole.

I shall not here specify all the changes that I have made in preparing this second edition, for the reader will be the most competent judge of them; and it is for him alone to decide, whether my labor shall prove serviceable in the object we should all lay to heart, of extending further and wider the usefulness of our calling amongst the people.

It may not be out of place, however, to say that, besides the relation of new cases, the recasting of my remarks on Cyanosis, and many fuller explanations of motives in practice, I have substituted for the former chapter on Puerperal Fever, a new chapter under the head of Childbed Fever. In that chapter, I trust, I shall be found to have made somewhat more clear and intelligible, the views that I deem most important upon the nature, seats, causes, and treatment of that disorder; and that I have, also, set forth with sufficient clearness, the motives that have long impelled me to reject the doctrine of its contagiousness. If only this part of my work should be favorably received by my brethren, I shall ever consider that I have, in it, done an acceptable service.

Lastly, I feel most grateful for the kind reception heretofore given, in this country, to my contributions to medical literature, and most thankfully acknowledge my obligation to improve them as opportunity arises; but this sentiment is blended with regrets, that, amidst the agitations, the distractions, and the fatigue of a physician's life, less time is allowed me for revision than is demanded by the many demerits of all that I have hitherto written.

CHARLES D. MEIGS,
324 *Walnut Street.*

APRIL 3, 1852.

A LETTER.

MY DEAR SIR:

Having taken the liberty to inscribe this work with your name, which I never pronounce without a feeling of affectionate respect, I desire to say a few words to you in explanation of my views and wishes in regard to the volume.

You may haply be aware that I caused to be printed, some years since, a small volume, entitled the "Philadelphia Practice of Midwifery:" a second edition in octavo form, and somewhat enlarged and amended, has now been for a considerable time exhausted; and although I have had proposals to publish a third edition of the Treatise, it has not been convenient for me to undertake the labor until the early part of the past summer.

Upon completing my arrangements with the Publishers, and commencing the task, I was induced to recast and rewrite a great part of the work; in which I did not wholly reject the fruits of my studies in earlier years. This Treatise is, however, so different from the former, that I conclude I have a just right to present it to you as a new one; and accordingly have adopted a new title, as you will have seen.

I have addressed it to the Student, and it is to him that I speak in every page. This I have done because I was not to presume to instruct those who know as well, or perhaps better than I, every point of duty appertaining to the vocation of the accoucheur, both as to the Science and the Art. I was well aware that there are many of my brethren in this country who publicly relate their experience, and explain the rationale of all the Art and Science of Obstetricy to large classes in our numerous medical schools; and I had no pretensions to know more upon these subjects than they, nor to instruct them. Induced by these views, I have been, perhaps, too elementary in some parts of the work, and addressed the Student only; but I hope it will be found that the explanations I have given may serve to remove difficulties from the track of the Medical Student, while they may perhaps lend facilities to the progress of the young and not much experienced practitioner. I thought that young accoucheurs, who, in the distant and thinly settled parts of the country, might require a consultation where time and opportunity would not allow of it, could find herein some needful counsel and explanation, and that it would be for me a great happiness to be useful in such emergencies. Hence I have entered into many particulars, and even trivials, that are not commonly set down in the books.

As to the scientific part of the work, I may say that I hope it will be useful to the Student. If I have succeeded in exhibiting just views in that department, my labor cannot be without fruit; since it is only by such means that the vocation of the Surgeon-accoucheur can become an elevated one. It is the Science of the practitioner that raises him immeasurably above the most dextrous midwives of the land, dexterity which indeed does not prevent their ignorance from rendering them unsafe depositories of such important interests as those that concern the conservation of our wives and daughters, and their little children. An accoucheur who is merely dextrous, and who is not acquainted with the scientific parts of his profession, may be in a manner superior to the midwife, but in some regards he is inferior; since to his employment, his sex is an objection, which ought to be waived only in consideration of his Scholarship.

I have in all this treatise endeavored, upon suitable occasions, to inculcate good motives.—Good and pure motives are very essential to the honorable estimation of this department of Medicine and Surgery.—I believe that the sentiments of good Monsieur Viardel, on these points, are quite just, and I shall take leave to cite the following fragments from his book at page 261. M. Viardel, who was in full practice at Paris about 1670, in speaking of the Accoucheur, says:—

"Il doit être propre dans ses habits, mais toutes fois vêtu modestement, et non en fanfaron; * * * * * * * * * * il doit, de plus, être doux dans ses paroles, et agréable dans sa conversation; * * * * * * mais surtout, il doit être prudent et discrét: prudent à dresser son prognostic, et à prévoir ce qui doit arriver, de peur de n'encourir le blâme des assistans. Il doit être discrét, et ne point réveler le secret qu'on lui aura confié. * * * * En un mot, il doit être patient pour ne pas se rébuter, humain et charitable, surtout envers les pauvres, et n'agir pas dans son travail pour le lucre et son intérêt propre, mais comme dit l'Apôtre, pour l'honneur et la gloire de Dieu et pour consérver sa reputation parmi le monde."

Like all books, mine has some iterations; but I thought that to make my pages useful, it was inevitable to repeat statements; without which, I could not inscribe the why and the how on the same pages. If this is fit to be a book of consultation, it will be more useful for this fault. Hippocrates says that art is long; still, I think that, to repeat, is really to abbreviate; for the η δε τεχνη μακρη, and the η δε κρισις χαλεπη, both vanish under a clear and comprehensible delineation of the Why and the How for every special occasion.

I think you will find that I have in this book given a very clear relation of the new doctrines of menstruation, and that I have shown the Student the whole history and progress of the discovery of the mammiferous ovulum, from the time of the detection of the germinal vesicle by the Breslau professor, down to the last, most complete and admirable exposition of the whole subject by M. Coste, of the College of France. If this part of my publication is full and clear, I cannot doubt of its being advantageous. If I have done but this, and no more, I shall look confidently for useful results to my labor. For I know that multitudes of the younger class of my medical brethren, and especially of those that still belong to the Student-class, were formerly grossly neglected as to their instruction in these particulars. No one should be sent forth with a diploma certifying his acquaintance with all the branches of Medicine, whose therapeutical course, while uninformed on the questions referred to, could not but be a mere succession of conjectures and blunders rather than the sure steps of a learned and accurate reasoner.

Apologetically, I pray the reader may know that the labor of this writing and publishing, added to my professional vocations, has been so severe as seriously to affect my health—to that degree, indeed, that I have been compelled to finish it by the assistance of an amanuensis, who has written at my dictation, and read the proof-sheets. I have not dared to examine the proofs of the last 250 pages, on account of a distressing neuralgia of the eyes, which has also prevented me from reading any book or considerable pamphlet since the autumn.

It may be that I ought to solicit from my American brethren, a favorable acceptance of this work, the fruit of many years of painful toil in the acquisition of clinical experience and knowledge. I abstain from doing so, not because I desire not such acceptance, but only upon the certain conviction I have, that the book is no longer mine—and that, in going forth from my hands, it hath found many owners, each of whom will and ought to treat it as may seem good in his own sight.

As for you, my dear friend, I invoke your favorable construction of my design and action in publishing this treatise; and I pray you to believe that I am, with the greatest sincerity, your most obedient and most faithful servant, and attached friend,

CHARLES D. MEIGS.

PHILADELPHIA, *Feb.* 1849.

To DR. DRAKE,
PROF. OF THE PRACT. OF MED., *Univ. of Louisville, Ken.*

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OBSTETRICS.

PRELIMINARY OBSERVATIONS.

I HAVE called this work Obstetrics; the Science and the Art, because while I look upon Obstetricy as a real Science, I consider Midwifery to be merely an Art founded upon a truly scientific basis.

OBSTETRICY comprises the several sciences of Anatomy, Physiology, and Pathology, in so far as they relate to the structure, the functions, and the diseases of the reproductive organs; it also includes the whole of Embryogeny, together with the Therapeutics and Surgery of sexual diseases and accidents, and the disorders of new-born children. Hence it seems just to regard an Obstetrician as a physician, who, to the general qualifications of men of his class, joins all the peculiar information and skill that are required in a person having special charge to treat the sexual affections, whether as arising in the Department of Midwifery proper, or as occurring independently of pregnancy, labor, or the lying-in state. Obstetricy, therefore, is the science of woman's nature, diseases, and accidents, and is a copious and comprehensive science; while MIDWIFERY is the art of assisting women in labor, and of guiding their conduct throughout the following confinement. This art, which has existed from the earliest periods, though rude and imperfect in its beginnings, has, with the lapse of ages, and through oft-repeated experiences, and much philosophical examination of the principles that should govern its ministrations, come to such a high degree of perfection in its rules and observances, that the medical student ought to find it not only an easy study, but one interesting and pleasing to the mind; for all studies are the more agreeable, in proportion as they lead to sure results, inspiring confidence in the student, and convincing him that he is continually augmenting by his scientific attainments his power to do good unto his fellow-creatures. I think there is no study in Medicine, that leads so certainly to useful executive power under well conceived rules of action as that now under consideration.

Some of my readers might be disposed to call in question the claim of Obstetricy to be classed among the Sciences, and to look upon it as a sort of collections or fascicles of various sorts of knowledge rather than as a real science; and here I may remark, that knowledge of things is not science, and that any conceivable amount of information that any man can acquire would, by no means, entitle him to be considered as a man of science unless the items of his knowledge should prove to be methodized or classified; because science is classified or methodized knowledge, and nothing more nor less. If a man could be supposed to know every member of the zoological series, or every plant, shrub, or tree in the universe, he could not pretend to be a scientific man unless he should have a methodical knowledge of them all: nor would his knowledge be of any use to himself or to mankind, since he would know nothing of the relations of animals to each other, nor have any conception of the resemblances or differences, which enable scientific zoologists and botanists to know, almost at sight, where to collocate any newly discovered thing, whether of the animal or the vegetable kingdom. He would neither know where to find anything, nor where to place it if it should come in his way.

Our obstetricy has gone so far that it certainly is possible to methodize or classify all the items of it, and enable the student at once to seize upon the connection of any one thing or idea with any others, or with the whole of the science. But it is only of late that such a scientific character could be justly attributed to it. Any person at all familiar with the medical writings of the Greeks, the Romans, or the Arabians, will acknowledge that their midwifery productions ought not to rank among the sciences, however highly we may prize them as the expositors of opinion and practice in their several eras. In like manner, it is impossible to say that the works of Paré, of Guillemeau, and Lamotte are truly scientific productions. Even Mauriceau may be questionable on this point, though he is, in some respects, quite methodical. So with the earlier English writers, Rainald, Chapman, Giffard, and Burton, who do not rise to the height of science, because they had, in their day, no classification or method. Dr. Denman, however, Prof. Davis, Dr. Robert Lee, Dr. Ramsbotham, and many other distinguished English writers, with a host of French and German authors, have so methodized or classed the various integral portions of obstetrics, that it has now a fair title to be called the science of obstetrics, on which is founded the art of Midwifery.

I do not suppose that any person will object to a division of the subjects to be treated of in this volume, into the two departments of Obstetrics the Science, and Midwifery the Art because it is a difficult thing to discover a truly natural method of our obstetrical knowledge. It is, perhaps, not easy to find out a natural method of its study; and yet it is true that the whole matter is comprised in what relates to the female pelvis, to the sexual organs, and to the new-born child. To me it seems clear that, in the above three divisions or classes I have places in which to collocate every individual item of the information I do now possess, or may hereafter acquire concerning obstetrical and midwifery matters, and that it serves me as the basis of a sufficiently natural method of arrangement. In his Introduction to the *Regne Animal*, M. Cuvier said: "There can be only one perfect method, and that is a natural method. This is the title given to an arrangement in which beings (*subjects*) of the same genus are placed nearer to each other than to beings (*subjects*) of any other genera; those of the same order nearer together than those of any other orders, and so on throughout the arrangement. This is the ideal method, to which everything in natural history should tend; for it is evident, if it could be attained, we should be in possession of an exact and complete expression of all nature. In a word, a natural method would be the whole science, and every step towards it carries the science nearer to perfection." A natural method of obstetricy is the desideratum, and to get at a natural method here, it is only necessary to treat in succession,

I. Of the Anatomy of the parts concerned in the acts of Reproduction.

II. The Physiology of Reproduction.

III. The Therapeutics and Surgery of Midwifery and Obstetricy.

IV. The History and Diseases of the new-born Child.

These four divisions, classes, or departments of obstetrics, though each suitable to be treated of in a separate book or volume, yet they give us a classification easy to be remembered and referred to, and I could doubtless follow it out rigorously in these pages, though I may occasionally prefer to transpose the various opinions, facts, or precepts that follow, from one department to another without an unvarying adherence to this exact order or method. Such an arrangement shows our obstetricy to be a real science, in so far as method is a condition of it; and we can, by dividing our subjects in the manner proposed, reduce to classes, genera, and species, the various topics or facts that are to be exposed, and so, with due pains-taking, make of this book a kind of ledger, in which shall be posted up at page, line, and column, all the particulars we may think fit to enter into its paragraphs.

This work, which first appeared under the title of the *Philadelphia Practice of Midwifery*, a small 8vo. volume of 370 pages, was printed by James Kay, Jr. & Brother, in 1838. Since that time it has undergone many changes, and, as appears at the end, now comprises about 750 large octavo pages. As I have superintended several editions of the work, which has appeared in various forms, I have felt privileged to adopt the advice of Horace, in his tenth satire of the first book:—

> "Sæpe stylum vertas, iterum, quæ digna legi sint
> Scripturus;"

and I fervently desire that the labor of writing might prove as he says—

> "Denique sit quod vis, simplex duntaxat et unum."

Following out the design I had formed, so many years ago, of improving this American work, as I should gain greater ability by increase of knowledge of these matters, I have considerably altered the present edition.

As to the osteological portion of the treatise, I may say that it is almost wholly re-written; and I have introduced considerable portions of text relative to the reproductive organs, changes which I venture to hope will be found both beneficial to the student, and interesting to the older reader. In many places I have altered the expression, and in some of them have suppressed passages or transposed them in a way calculated to improve the treatise.

So many copies of the work have been taken by the country, that I have the greatest cause to be thankful to my medical brethren for so undeniable an evidence, and indeed proof of their kind acceptance of my labors. The descending path of life in which I now walk, is made more cheerful by the conviction that, unaided by fortune or early patronage, I have been so far favored by the medical men of America as to bring this volume, and others that I have written, to repeated editions. There is not among the thousands of United States physicians a man to be found who is more profoundly sensible than I am of the social importance of our pursuits, of their indispensable necessity for the well-being of society, or of the stern duty incumbent on every one of us to do something to render it both more clinically useful, and socially reputable.

PART I.

ANATOMY OF THE PARTS CONCERNED IN THE ACTS OF REPRODUCTION.

CHAPTER I.

THE PELVIS.

The pelvis, anatomically considered, is a structure composed by the union of several bones that are respectively denominated sacrum, coccyx, ilium, ischium, and pubis, all which, being arranged in their proper places, and bound together by cartilages and ligaments, covered with tissues of various kinds and provided with certain important viscera within, and with other organs on the exterior, require no little study and reflection by those who design to learn obstetricy in order to acquire a competent knowledge of the art of midwifery. It is the duty of the anatomist to particularly describe all those parts, and point out their relations to each other and to the whole economy; but, in the view of the obstetrician and accoucheur, the pelvis is seen to be a bony and fleshy canal, designed to contain, support and protect the organs of generation, and give passage to the fruit of the womb.

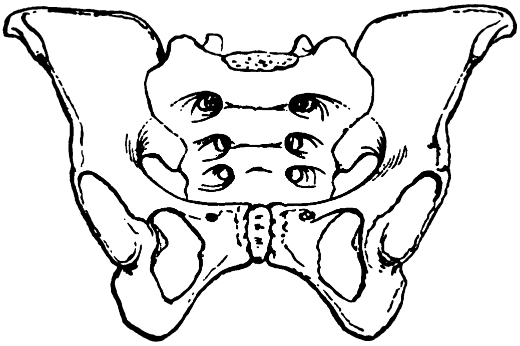
It is owing to the peculiarly complicated forms of the pelvic canal, that the act of parturition in women is more difficult, painful, and dangerous than in other mammiferous beings, for it is to the peculiarities of that canal that is due the power possessed by women to give birth to their children by what is called a vertex presentation, a thing impossible in all other mammifers, even those most nearly allied by form to the human family. There is not one of them that does not present its offspring in what is called the face presentation, the muzzle and not the back of the head, or vertex, being the presenting part. In our race the ratio of volumes of the fœtus and pelvis ought to be carefully studied by every conscientious student, who can never duly comprehend them until he has first become acquainted with every bone that makes part of this interesting and curious organ. Hippocrates long ago compared the child in its mother's womb to an olive in a narrow-necked bottle: If one of the poles of the olive presents itself to the opening, it can readily pass out; but if it presents itself transversely, its position must first be changed before it can come forth, or else the olive or the bottle must be broken for its extrication. Hence the subject of presentations is a most important one in relation to the study of the pelvis.

If the pelvis does offer the most considerable of those obstructions and embarrassments that are met with in the practice of Midwifery, and if the relation of it to the child is of such vital importance in our proceedings, then every just, wise, and earnest student of obstetricy will feel himself bound to carefully inquire into its nature and properties, and he will, I am sure, discover that, while dry and uninviting in its particular details, it is, as a whole, clothed with the very highest interest. This lively interest in the study of the pelvis is, however, not confined to its mere midwifery connections: for, as all the organs of reproduction in the female are laid either within or upon the pelvic bones, so their whole life, power, and offices, as well as their places and positions, are inseparably allied to, and dependent upon their osseous basis, without which they could never be developed nor exist. A professional man ought to know these parts so well as to have attained to the possession of a perfect ideal of them, having them intellectually or spiritually drawn on the tables of his mind as an ever present model with which to compare every medical case in the category presented for his opinion and judgment. With such an intellectual ideal model ever at hand, he could measure every faulty form, crasis, or function, and every deviation in place, and so become, as it were, incapable of making mistakes in diagnosis or action; his ideal pelvis, and its apparatus, would for him be the norm, all that should agree with it being normal and all others abnormities.

The word is derived from the Greek πελυς, which corresponds to our English word basin. The Latin word pelvis has become a part of our technical, and indeed of our ordinary language, as it is of the French didactic language, according to Prof. Dubois. Its true interpretation is hips or hip-bones, or haunch or haunch-bones. We do not usually employ, to express its idea, the English word basin, while the French mostly call it *le bassin*. Italians speak of it as *il bacino*, the basin; Germans denominate it *das becken*, the basin; Spaniards, *la pelvis*, the basin; and Swedes call it *backenet*, the basin; whence it appears that the idea of a pelvis has some connection with the idea of a basin in all the above named languages.

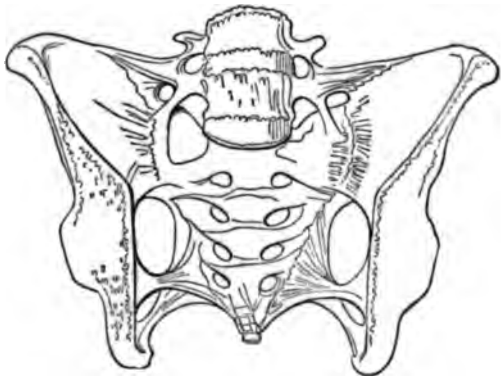
The annexed figure (Fig. 1), which represents a well-formed female pelvis, drawn in outline, exhibits this resemblance to a basin, though faintly, and the fainter, indeed, because the whole upper edge or front side of the bowl seems to be broken away, both above the front or pubic bone, and below it at what is called the arch of the pubis. The great upper vacuity is seen in the drawing between the two angular points, one on the right and the other on the left side of the drawing—projections that are known as the anterior-superior spinous processes of the ossa ilia. Beneath the front bone, or pubis, as it is called, there is another great vacuity, shaped like an arch, which is called arch of the pubis; and, indeed, the whole bottom of the bowl or basin is wanting in the dried specimen. Not so, however, in the recent subject.

Fig. 1.



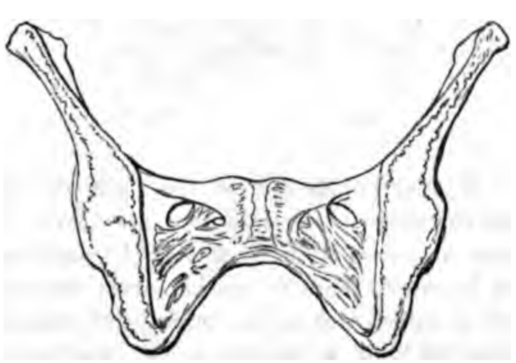
But, while the whole profession everywhere agree to regard this organ as *πελυς*, pelvis, bacino, backenet, bassin, becken, basin, &c., they are equally agreed to call it two pelves—an upper and lower, a greater and lesser, or a true and false pelvis; and they divide these two pelves from each other at the brim, entrance, inlet or strait, as it is variously denominated. The student will observe, in Fig. 2, that I have cut the pelvis transversely by a vertical section, and I present it here in order that he may see how naturally the writers have been led thus to divide the pelvis into a greater one above and a lesser one below, for it is evident that the lower portion of the drawing

Fig. 2.



represents a form or a cavity very different from the broad and expanded portion above. Fig. 3 shows the front segment of this same divided pelvis, and exhibits the shape of the front inner wall of the true or lower pelvis. If the two segments should be readjusted, they would reproduce the pelvis of Fig. 1. These two figures ought to instruct the student as to the real canal of the pelvis, and show him that if any difficulties should arise in the course of a labor, on account of the bony canal, those difficulties would be connected with this true, or lower or lesser basin, and not with the great or superior basin, which is so capacious that obstruction could hardly arise within its walls. Hence he ought carefully to study the conformation and properties of this lower basin, if he would make himself equal to the responsibilities of obstetrical practice.

Fig. 3.

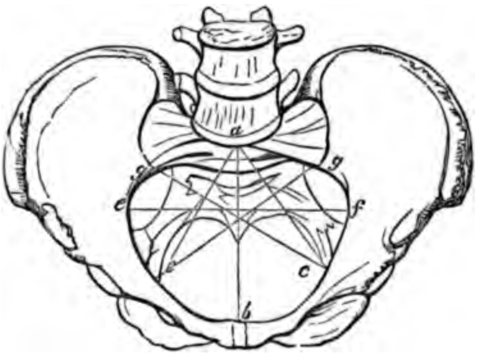


As the sacral bone has its sacro-lumbar facette cut so obliquely that the sacrum descends in a backward as well as downward direction, producing the projection, promontory of the sacrum, or sacro-vertebral angle, the entrance or inlet of the pelvis is rendered, by the promontory, narrower from front to rear than it is when measured either transversely or obliquely, this sharp angle of the promontory being the posterior limit of the brim. From the promontory there is a sort of raised line or ledge running round the pelvis, left and right, to stop at the top of the ossa pubis (Fig. 1), and because this raised line runs along both the ilium and the pubis, it is called the ilio-pubal line, or ilio-pectineal line. The Romans called the pubic region pecten, hence linea ilio-pectinea; for, as the pudenda is clothed with hair, the term pecten was applied to that region, and the bone of the pubis has been called the os pectinis. Juvenal speaks of the pecten in *Sat.* vi. 370.

Inguina traduntur medicis jam pectine nigro.

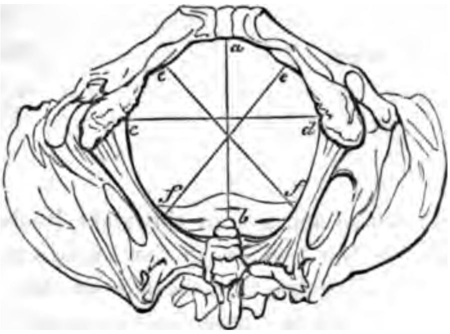
Now this linea ilio-pectinea serves as a sort of stricturing band, to make the pelvis small at the inlet, and produce a narrowing there. This narrow passage, from the greater down into the lesser basin, is called the superior strait of the pelvis; all that is above it being upper basin, and all that is below it being lower pelvis, lower basin, pelvic canal, excavation, cavity or true pelvis; for, by so many different names is it known in the profession. Hence, let him learn what the superior strait is—its form, and its dimensions; let him well and truly learn the shape and size of the true pelvis, and the student will find that while it has an inlet or abdominal or superior strait, it also has an outlet, inferior, or perineal strait—the former at the beginning, and the latter at the end of the pelvic canal—all of which requires his careful study.

Fig. 4.



These two straits of the pelvis differ from each other very much in shape and direction, as may be discovered by inspection of the Figs. 4 and 5, which represent the superior and inferior straits of the pelvis. In Fig. 4, one is looking downwards into the pelvis, and in Fig. 5 upwards through its inferior strait. In Fig. 4, the distance from promontory to pubis ought to be at least 4 inches from *a* to *b*. The distance across the opening from *e* to *f*, should be 4½ inches; and the two oblique diameters, *c g*, *c g*, should be five inches each. In Fig. 5, however, the longest line is that from front to rear, and not the transverse or oblique ones, so that the longest diameters of the two straits do not coincide, which renders it necessary for the child to make a spiral turn or revolution as it descends from above, to be born—a turn that is technically called rotation of the fœtus. I shall, in another page, speak of the lower strait, as consisting of a double plane.

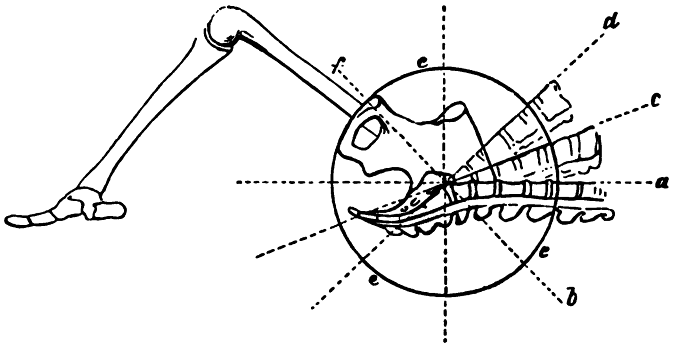
Fig. 5.



Most of the bony resistance experienced in labors, is resistance met with at one or the other of these straits, though it is true that we sometimes meet with cases in which the excavation itself does offer very great obstruction to the birth of the child.

I have pointed out the ilio-pectineal or ilio-pubic line, and I wish to say that it is the boundary or margin of the superior strait. Let it be occupied with an imaginary superficies, and call that superficies the plane of the superior strait. A line falling perpendicularly upon this plane just midway between the pubis and the sacrum and in the middle of the transverse diameter, is the axis of the superior strait; or, to speak more precisely, it is the axis of the plane of the superior strait. Now, as such perpendicular line does not correspond with the long axis of the trunk of the body, but comes out of the trunk at or near to the umbilicus, and touches the lower end of the sacrum within the pelvis, the plane of the strait is an inclined plane, and it is inclined more or less according to the posture assumed by the patient or the subject. In general, the inclination of this plane is about 50°. If the individual stretches herself upwards, and leans backwards as far as possible, the plane of the strait inclines the more; but if she bows herself forward, she may bend the trunk over the strait so far as to make the opening wholly lose its inclination, and take an adjustment at right angles to the body. The annexed figure (Fig. 6) represents a pelvis and spine, with the right lumbar extremities. If the subject lies on the back, with the knee-joint flexed, the plane of the strait (*f b*) will make, with the axis of the trunk (*a*), an angle of 140°; or, in other words, the inclination would be 50° below the horizon if the individual were standing up. But if the trunk should be raised up to *c*, or even carried forwards to *d*, the inclination would, at *c*, be 22° 30, and at *d* nothing at all; for at *d* the plane would be at right angles to the trunk.

Fig. 6.



It is very well worth while for the student to note these things, because the ease or difficulty, the celerity or slowness of a labor may depend upon the degree of this inclination, and on nothing else, and he can understand why a woman who stretches her limbs quite straight out in the bed, and bends her trunk backwards by means of a pillow under the loins, should fail to drive the child's head right through the inlet, and rather force it against the top of the pubis than into the opening; whereas, if she should bend the trunk forwards in a proper manner, she would at once thrust the infant's head through the aperture and drive it down to the very bottom of the excavation. The knowledge of these circumstances, and a vigilant attention to all the details of his duty, enable a practitioner to obviate much suffering for the poor female, tormented with the pains and anxieties that attend upon the parturition of human beings; for the physician may direct the woman to take such a position as to adjust the inclination as he pleases. Indeed, it is an instinctive knowledge that induces almost all women in labor to bow themselves forwards, and a long experience leads the wise matrons, who come to her help, to frequently advise and exhort her to "bend forwards, my dear; bend well forward to the knees."

I shall conclude this part of my subject, by proposing the question: what is the superior strait, and by the answer—the superior strait is the narrow pass from the greater, downwards into the lesser basin or pelvis; it is bounded by the linea ilio-pectinea, and its plane, which is an imaginary superficies, is inclined about 50° in a person standing upright—some authors say 60°; it is 4 inches from front to rear, 4½ inches from side to side, and 5 inches in its two oblique diameters; and such are the diameters of the superior strait. I mean to say that a superior strait, possessing these dimensions, ought to be pronounced perfect all the world over, and that while it is true that we meet with many that are larger, we also meet with many that are smaller. A pelvis is large enough when it is as large as the above proposed model. Let the student, however, remember that the larger it is the less the obstruction and difficulty it can give rise to in parturition, and *vice versâ*.

When two ossa coxalia are correctly adjusted in their places upon a sacrum the pelvis is reconstructed, and we see the pubic arch, the great vacuity above the pubis betwixt the two anterior superior spines of the ilia, the vacuity behind between the posterior parts of the ilia, and a great notch on either side, between the wings of the sacrum and the ossa ischia, and which is called the sacro-sciatic notch. All this, as I before said, gives the idea of a broken basin; but not so in the living subject, for there the upper vacuity is occupied by the tendons of the external oblique muscles, by the recti and pyramidales, and by the abdominal fascia and integuments. On the posterior part, the great basin is made complete by the lower lumbar vertebræ which rise up from the base of the sacrum; by the ilio-sacral and sacro-lumbar ligaments, and by the muscular and tegumentary tissues that complete the round in that direction.

Inferiorly, the pubal arch is closed by the genitalia; the sacro-sciatic notches are occupied with ligament and muscle, &c., and the perineal strait is closed by the tissues of the perineum, &c., which thus complete the basin or pelvis, and give it a right to be so called, while it is difficult to see any likeness to a basin in the dried osseous specimen alone.

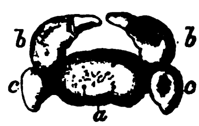
Having now taken a general view of the pelvis, let us proceed to its analysis, or to an examination of the several bones by whose union it is composed; and this, perhaps, is the only way in which we can correctly compass the important study.

The question that first arises, is: Of how many pieces does a pelvis consist? and the student may properly reply that it is composed of four separate bones, which are: 1st. A sacrum; 2d. A coccyx; 3d. A right, and 4th, a left os innominatum. It would, however, be equally true to say that a pelvis is composed of eight bones, that may be enumerated as follows, videl.: 1. A Sacrum. 2. A coccyx. 3 and 4. A right and left pubis. 5 and 6. A right and left ischium. 7 and 8. A right and left ilium; and if he should choose to say that a coccyx consists of three pieces, he would enumerate ten instead of only four or only eight separate members of a pelvis.

The Sacrum.—The most important bone of the pelvis is the sacrum, because all the others are dependencies of it, and take their character and proportions from it. Indeed, they could not exist without it, as the limb could not exist without the trunk of the tree from which it arises.

In its origin, a sacrum consists of the elements of five vertebræ, which, in the process of growth, become consolidated or anchylosed into one firm sacrum, and each of the several vertebræ was formed by five points of ossification, that are here represented in Fig. 7, in which *a* is the original body of the vertebra; *c c*, the right and the left transverse processes; and *b b*, the rudiments of the spinous process, which also form the bridge or spinal canal. Even so late as the period of birth, and long after the season of viability of the fœtus is passed, the five separate members of each sacral piece are still unconsolidated, and fall apart on being macerated or boiled. But, as the child grows in volume and stature, the bodies of the vertebræ and their transverse and spinous processes

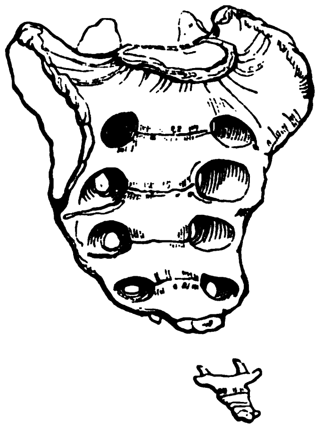
Fig. 7.



or bridges unite with each other, and the whole of the five vertebræ become fused or soldered, so to speak, into one piece—the bodies making up a sort of central columnar portion—the transverse processes converting themselves by fusion into the bony wings or sides of the sacrum, and the bridges and spinous apophyses becoming the sacral canal and the spinous ridge of the bone. As the transverse processes blend themselves together in regular succession, from top to bottom, they necessarily leave apertures which could not close because the terminal brush of the spinal cord sends out the sacral nerves to make the internal sacral plexus, the origin of the great sciatic nerves that pass outwards through the incisura or sacro-sciatic notch to be distributed on the lower limbs, and thus it is necessary that the sacral holes remain open.

The consolidation of the several sacral pieces has communicated to the sacrum the shape of a three-sided pyramid, whose apex is turned downwards and its base upwards, forming a seat on which the lowest lumbar vertebra rests. The spines or spinous apophyses and the bridges divide the posterior aspect of the sacrum into two smaller faces, while the whole front of the bone makes one large triangular face of four inches to the side (see Fig. 8). This front face, or side of the pyramid, is not plane, but bent or curved so as to make the face quite concave, and give rise to what is called the hollow of the sacrum. The degree of this curve differs in different subjects, but is generally half an inch or more in depth.

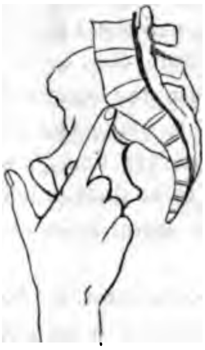
Fig. 8.



In studying the sacrum, it is usual to regard it as having an apex or point (Fig. 8); a base or top; an anterior face or hollow; two posterior faces, each a right-angled triangle; two wings or sides, behind each of which, at the top, is an ear-shaped articulating surface or auricular facette; also ten sacral foramina, or holes for the transmission of internal sacral nerves. These holes are arranged in two upright rows of five holes for each row, which are on each side of the central columnar portion, or bodies of the false vertebræ. The apex terminates in an elliptical convexity, at which the sacrum touches the coccyx at the sacro-coccygeal joint.

At the base or top, is seen an oval-shaped articular surface, which is the seat upon which the lowest lumbar vertebra rests, and from which, as from a plinth, rises upwards the tall spinal column. This sacro-vertebral facette being cut obliquely backwards causes the sacrum to deviate from the vertical line and retreat or go backwards and downwards behind the spinal column, and thus cause the appearance of a projection in front, overhanging the inlet or superior aperture of the basin, as in the annexed cut (Fig. 9), in which the finger is touching the promontory of the sacrum or sacro-vertebral angle, or projection of the sacrum, for it has all these names.

Fig. 9.



The anterior face of the sacrum is nearly an equilateral triangle, of four inches to the sides, and its concavity is deep enough, the foramina being stopped with cement, to hold an ounce or even an ounce and a half of water. It is of great moment that this curve should be just right, as too great or too small a depth is equal to a deformity, and is attended with increased pain, delay, and danger to the laborant. The child, in being born, executes a spiral turn on its long axis, a motion that is known as the rotation of the child, and which, though easy enough in a well-formed hollow, becomes very difficult, or even impossible, in a case where the curve is deficient. Excessive curvature is, also, to be deprecated, as it cannot exist without injury to an antero-posterior diameter.

Both of the posterior faces are convex, very rough, separated from each other by the bridges and spinous process of the sacrum, and provided, like the front, with, each, five sacral foramina for the passage of nerves to the exterior of the pelvis.

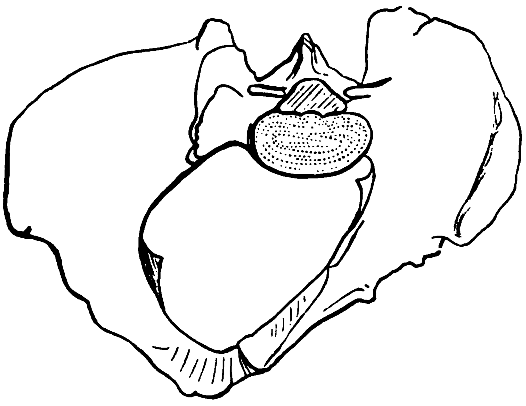
The five bodies of the sacral vertebræ have, by anchylosis or fusion, become consolidated into one columnar piece, out of which has been constituted the column or columnar portion of the bone, while the fusion of the ends of the transverse processes together, has converted those processes into wings. It is right to consider the wings as extending along the sides from top to bottom, and not right to limit the idea of wings, to the united transverse processes of the three upper pieces only, as seems to be the intention of Dr. A. F. Hohl, in his new valuable work, *Lehrbuch der Geburtshulfe*, 1855, p. 30; and in his excellent quarto, *Zur Pathol. des Beckens*, p. 6.

I said the sacrum was the most important bone of the whole collection, because it may be considered as the basis or parent of all the others. Now, as the sacrum, while growing, touches the innominatum by its three upper segments, and by them only, the two bones, sacrum and innominatum, there indent each other mutually and thus give rise to an ear-shaped joint-surface, which is called the auricular facette, in each of them. This auricular facette has, therefore, nothing to do with the fourth and fifth segments of the sacrum, for they nowhere touch the innominata, but are separated from them by the incisura, deep cut, or sacro-sciatic notch.

If, in any sacrum, the wings are correctly developed, the superior strait cannot be deformed in such a way as to produce what is called the oblique ovate pelvis, for the curve or round of the linea ilio-pectinea must be, in such case, correctly drawn; but if one of the wings, which ought to be about fourteen-tenths of an inch, should be only five-tenths of an inch long, the pelvis must of necessity be deformed or crooked, having the pubal symphysis cast far over to the right if the fault is in the left, and far over to the left of the mesial line if the right wing is too short.

As the concavity of the wing determines the shape of the inner wall of the pelvis there, it is evident that too short a wing will cause the change of form above mentioned, and determine the existence of the oblique ovate deformity. I should think this too evident to require any further illustration than that of the subjoined Fig. 10, which is a camera-lucida drawing from an oblique ovate pelvis in my museum at Jefferson College. The left wing is seen to be the contracted or faulty one, whose shortness has caused the symphysis pubis to be placed awry, or far over to the right. The fault is connected with a bony anchylosis of the left sacro-iliac synchondrosis—a circumstance common in these oblique ovate deformities.

Fig. 10.



Great attention has, of late years, been paid to the influence of the sacrum in producing horizontal deviations of form in the pelvis, and our modern information on the subject is principally due to the care of the late eminent Prof. Naegelé, of Heidelberg, in giving to us his work *Das Schraag Verengtes Beckens.* Dr. E. Gurlt, also, in his *Ueber*

Einige durch Erkrankung der Gelenksverbindungen Verursachte Misstaltungen des Menschlichen Beckens, furnishes us with copious notices of what has been done for our science in this particular up to a late date. While it is to Dr. Anton. F. Hohl, in his *Zur Pathologie des Beckens*, 4to., 1852, that we are indebted for the fullest and clearest accounts of the matter of oblique oval deformations. Prof. Rokitansky's 3d vol., *Manual of Path. Anat.*, p. 250, furnishes that teacher's views of the deformity, which he attributes, in some cases, to congenital, and in those that occur after birth, to rachitic causes; as does also Scanzoni, p. 149, *Lehrbuch der Geburtshilfe*, 11 Band. For the present it may suffice for the student to reflect that faults in the wings of the sacrum cannot but bring about great faults of form in the female pelvis—the nature of which he will, from the foregoing, readily comprehend.

I beg the student to examine the ten holes called sacral foramina, which he will find in the front or hollow of the sacrum (Fig. 8), that he may inspect the grooves there to be seen. As those holes give passage to large nervous cords that go to make up the right and left sciatics, let him notice, in these grooves of the sacral foramina, provision against dangerous pressure and contusion of those important nerves by the passing head of the child. Even with the protection of those grooves, serving, as it were, half to bury or hide the nerves in their hollows, few women having labor pains fail in some one of the stages of parturition to admit of a severe pressure of the nervous cords, and when the hard bony head of the fœtus is jammed with considerable force upon the sensitive substance, the laborant is heard to cry out that she has cramp in the thigh, or the leg, or the foot. For a woman in labor, the natural labor pains are as much as she can well bear; and she can bear them well if she be of a firm courage and blessed with patience and hope; but if some abnormal and extrinsical pain comes to attack her, the course of nature seems to be turned aside or prevented, and the labor stops. Hence it is that a severe pressure on one or more of these sacral nerves, may wholly arrest the progress of a child-birth, and eventually compel the practitioner to interfere by means of instruments.

I think one of the most fearful instances of human agony that my eyes have ever witnessed, was that of a lady in North Sixth Street, Mrs. Th. S——y, who, being in labor of her first child, and making rapid progress towards a delivery, began suddenly to scream, with the greatest violence, often uttering the words, "Oh, the cramp! the cramp! the cramp!" She was indescribably agitated, her countenance assumed the wildest expression, and all the persons in her chamber became much alarmed on account of the extreme degree of anguish, or rather agony, which was depicted in her countenance and expressed by her shrieks. I had, for many years, been accustomed to the cries of puerperal women, to which I had become habitually indifferent, but this case deserved to be called terrible. The cramp affected the muscles of her right leg. I explained to her that the cramp was caused by the pressure of the child's head upon one of the right sacral nerves, and though the appearance of the case was appalling, I exhorted her to bear down, hoping a few vigorous efforts would push the head lower than the point of pressure and relieve her from the misery. I was disappointed: the cries ceased with the relaxation of the throe, only to return with every renewal of the contraction. So intense was her distress, that she began soon to show signs of exhaustion of nerve-force, and I have now no doubt that she was in imminent danger of death from the excess of pain. The labor, as to its progress, was arrested with every renewal of the labor-pains; and it appeared that her whole life-force and perceptions were occupied with that sole agony. I was three-fourths of a mile from home; and while her husband was gone for my forceps, for which I immediately sent him, she renewed her cries about every four minutes. I think she would have died in half an hour. Upon receiving the instrument, I speedily applied it and drew the head below the compressed point, and she bore the extraction of it without a murmur, for the nerve was set at liberty as soon as I had drawn the head below it. During more than a fortnight after the labor, there was a partial paralysis of the limb, following the pinch the nerve had suffered betwixt the fœtal head and the bony pelvis. It did not wholly disappear for many days. Two years later I encountered a similar scene in the same apartment. She seemed to dread nothing in the approaching labor but the "cramp!" and engaged me to be prepared with my forceps, which I unfortunately declined to do. When the head descended into the pelvis, she was seized with precisely the same kind and degree of pain; the forceps were brought to me from the same distance, and she was again as speedily relieved. In this labor, as in the former, a partial paralysis and numbness of the leg followed the parturition, and did not disappear until the month was out.

In a third labor, during which I was confined to my house by sickness, she came under the care of my able colleague, Dr. R. M. Huston, well known for his skill as an obstetrician. The same scene was renewed in this third case, and the Doctor felt obliged to relieve her by extracting the head with the forceps. I have attended her in a sixth labor in the year 1846, and in a seventh on the 1st November, 1852, in which the position of the child was such as to avoid the pressure,

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and she gave birth to the infant without cramp, or any uncommon pain.

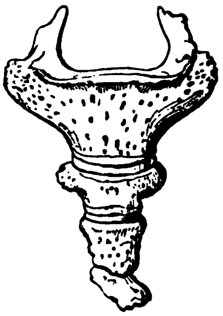
I was in attendance upon a lady living in Turner's Lane, two and a half miles from my house. The labor had proceeded very towardly until the head got well down into the pelvis. I was in a lower parlor conversing with her husband when we were both startled by the sudden, sharp screams of the patient from her chamber in the second story. We both hastened to the apartment, where I recognized a scene in all respects like those witnessed in the accouchement of Mrs. S——y. After vainly exhorting my patient to bear down and push the child lower than the nerve, I engaged Mr. —— to wake his servant, for it was night, and send him on the fastest horse to the city for my forceps. Her agony was indescribable during the whole period of his absence. He had a ride of five miles—out and in. I got the instrument, and the child was delivered within two or three minutes after it was placed in my hands. No evil consequences followed the pressure in this case. She had had several children, but in none of the labors had the nerve got so severe a pinch.

Here, then, are six cases of forceps operations rendered indispensable by pressure on the sacral nerves. I have seen no accounts of similar instances in the books. I have met with many hundred labors in which cramp was more or less violent; but these cases, above mentioned, were really frightful, and I have no doubt that both the distress and the danger were sufficient warrants for the instrumental assistance.

Very violent cramp in the leg or thigh sometimes attends upon awkward attempts to introduce the forceps, because the ignorant or careless operator suffers the end of the blade to press upon one of these sacral nerves, as it emerges from its foramen and passes along its groove. Any one who is causing this pain with his ignorantly directed instrument is, at the same time, in imminent danger of tearing open the thin postero-lateral wall of the vagina, and plunging the point of the clamp into the sack of the peritoneum; let him tremble for his rashness, and instantly desist from so wrongful a proceeding. While the forceps is passing upwards, the chamber should be kept very still, no one being allowed to talk, so that the operator may immediately know, by the woman's expressions or silence, that the blade is passing in the right direction.

Os Coccygis.—I here present a figure that represents the terminal or caudal extremity of the spinal column, of the natural size. It is called the os coccygis or cuckoo-bone; in vulgar language the crupperbone. It consists of three pieces, altogether about an inch and a half long, that are separable in the young, but become anchylosed into one solid piece as advance is made in years. Two styloid processes ascend from the posterior lateral surfaces to rest upon the back part of the apex of the sacrum, and prevent the point of the coccyx from being driven too far backwards by the displacing pressure of the fœtus in labor. The cornua, however, are not strong enough always to resist, and they occasionally break off with a loud sound. The sound may be heard at the distance of many feet from the woman in travail. In general, no very great inconvenience is produced by this fracture; although there are met with some instances in which a long-continued pain follows the accident.

Fig. 11.



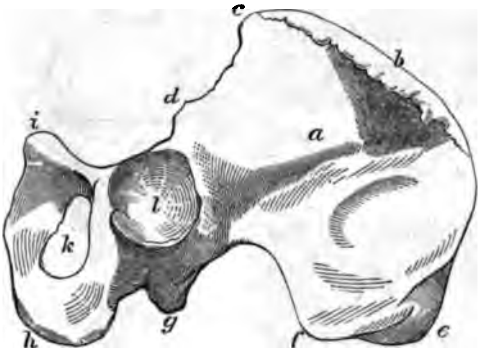
In young women, the articulation of the coccyx and sacrum is a movable one; anchylosis takes place only in those who begin to grow old, in advancing beyond the youthful season of bloom and beauty. Hence, it is better that a woman should have her first child before this bony anchylosis takes place, inasmuch as, when the sacrum and coccyx have become immovably joined together, the point of the little bone may arrest or distressingly retard the acts of childbirth.

The movableness of the coccyx upon the sacrum is much relied upon as a means of amplifying the antero-posterior diameter of the lower strait of the pelvis; but I do not think that the point of the coccyx usually recedes much during the transit of the fœtal head in parturition. Though most writers attribute to the coccyx a power to recede very considerably, my own observation has led me to regard this recession as less than it is generally reputed to be, and inspection confirms this doubt. The point cannot go very far backwards but at the expense of a fracture of the cornua and of the lesser sacro-sciatic ligaments, which tie it firmly in a certain proximity to the tuberosities of the ischia.

The Os Innominatum.—The side bones, which are technically known as the *ossa innominata*, or nameless bones; and also *ossa coxalia*, or hip-bones, by touching each other in front, and by resting at their posterior extremities upon the wings of the sacrum, serve to complete the whole pelvis, except the small os coccygis at the apex of the sacrum, which has been already described.

An os innominatum is so irregular in its shape, that I do not think there is any person who could describe it so as to be understood, unless aided by a specimen, or a drawing. I therefore annex the figure (12) that represents an outside view of the bone, near the middle of which is seen a cup-like cavity, *l*, which receives the round head of the thigh-bone. This socket, or cup, is known as the acetabulum, a word often used in midwifery, though the acetabulum is on the outer surface of the pelvis; hence, when the word acetabulum is used in our art, let it be understood as meaning the smooth surface on the inside of the pelvis opposite to the acetabulum, which is on the outside. It would be far better to say acetabular region, than acetabulum in midwifery, for that would express our real meaning, which the other does not, as there is no acetabulum within the excavation.

Fig. 12.

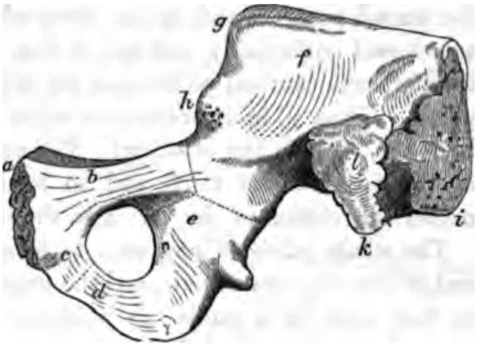


The figure (12) shows the left os innominatum, corresponding with the left half of Fig. 13. On its right is seen the broad expanded iliac portion of it, *a*, exhibiting its dorsum, bounded above by the crista or crest of the ilium, *b*, with its anterior superior spinous process, *c*, on the left, and its anterior inferior spinous process, *d*, a little lower down. The posterior superior, and the posterior inferior spinous processes are at the bottom of the drawing on the right, *e*, *f*, while just behind the acetabulum may be seen projecting backwards the spine of the ischium. At *h* is the tuberosity of the ischium, and the pubis (at *i*), whose descending ramus drops downwards to meet and unite with the ascending branch of the ischium. *k* is the foramen ovale, foramen thyroidean, or obturator foramen; *l*, in the bottom of the cup, is the acetabulum; *g* is the spina ischii.

I now present an inside view of the right os innominatum, in Fig. 13. Here the letter *a* is placed on the symphyseal end of the os pubis, which, when joined to the left os coxale, makes the pubic symphysis; *b* is the body of the pubis running backwards to the dotted line on the acetabulum, where it ends; *c* is the descending ramus pubis, and *d* the ascending ramus ischii. The letter *e* is on the plane of the ischium, and *f* on the iliac fossa or venter; *g*, the anterior superior spinous process of the ilium; *h*, its anterior inferior spinous process;

while *i* and *k* respectively indicate the posterior superior and the posterior inferior spinous processes of the os ilium. Towards the right side of the drawing may be seen, at *l*, the ear-shaped surface that is denominated the auricular facette, which, being covered with fibro-cartilage, and united to a similar facette on the sacrum, composes the sacro-iliac joint. The Student will please to note the three dotted lines in the middle of the figure, which indicate the respective limits of pubis, ischium, and ilium in that direction, and he will see that one-fifth of the acetabulum belongs to the pubis; that two-fifths of it are contributed by the ischium; while the upper and outer two-fifths are formed out of the os ilium. By examining these dotted lines, he will learn what parts of the os innominatum belong to each of its three constituent members. In fact, the os innominatum, as has been already seen, was originally three separate bones; which at or about the period of puberty become consolidated by bony anchylosis, or union, into one solid os coxale, hip-bone, or side-bone.

Fig. 13.



If an os innominatum be taken from a subject under twelve or fourteen years of age, and macerated or boiled in water, it readily separates into three pieces; and the separation takes place because the pieces, in an under age, are not consolidated or become one firm bone. The separation will occur in the acetabular region, where the several pieces are as yet not firmly united by ossific fusion; a union that cannot become complete until the body has acquired such a development as to fit it to undergo the fatigue of gestation, which rarely occurs until the fifteenth year. A bone, taken from the os innominatum of a subject about twelve years old, serves to show the Student the propriety of preserving for the adult skeleton the names of the three separate pieces; for he will learn therefrom that it is very convenient to refer to them in many cases where we desire to direct the attention accurately to a certain point of the pelvis, of which we can then speak, as its ischial, pubic, or iliac portion.

In respect to the acetabular region, or as it is for shortness called the acetabulum, I wish the Student to observe that it is one of the cardinal points in the circumference of the pelvis, and it is highly requisite that he should know that the left acetabulum is agreed upon by the profession to be considered as the cardinal point on the female pelvis. There are various cardinal points also upon the fœtus, as, for example, the vertex or point of the head, &c. Now, when the vertex, in the head presentation, is found to be at the left acetabulum, it is said to be in the first position; and if it is at the right acetabulum, it is in the second position, and so on; from which it appears that positions are classed numerically, and are, in fact, expressed as numerical relations of some cardinal point upon the child to the cardinal point of the pelvis. Thus, if, in a consultation upon the case, the question should be asked, what is the position? The answer might be, it is the first, or the fifth, or the third, and so forth, which would express the numerical relation of the vertex to the left acetabulum.

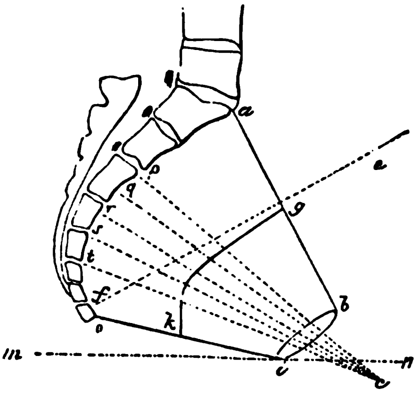
The whole pelvis is now seen to consist of a sacrum and coccyx, and of two ossa innominata, and the innominata themselves to consist, in fact, each of a pubis, an ischium, and an ilium. It has been divided into two basins that are called the greater and the lesser, or the superior and the inferior pelvis, that are separated from each other by the inlet, the entrance, the narrows or superior strait.

It is to the hollow of the sacrum that is due the cavity, or, as I am accustomed to call it, the excavation, for the sides and front of that excavation would, if the form depended upon them alone, render the pelvis a cone, which it is not, and indeed far from it, for it is an expanded cavity in which there is abundant room to effect those curious spiral movements of the child that are known as rotation—movements that could not be possible, were it not that the curve of the sacrum gives a sort of balloon-like shape to all that part of the organ that lies between the superior and the inferior straits.

As to the symphysis pubis, we may say that its inner aspect is convex rather than hollow, and as to the two ossa ischia, their inner faces are plane, and not only so, but these planes approach each other as they descend on each side of the basin or canal, so that a body that can lie between the planes at the top can by no means do so at the bottom of them, because at the top the planes are 4½ inches asunder, while they are only 4 inches apart at the bottom. The Student will please examine his specimen, or the Fig. 13, to see the shape of this famous plane of the ischium. I am truly desirous that he should get a complete idea of it on account of the influence it has in the mechanism of labors, for the spiral movement of the child is in a good measure due to this very plane, whose form and inclination compel it to rotate or make the spiral turn, which the hollow of the sacrum only allows, but does not compel it to do.

I refer the Student here to a drawing (Fig. 14), which exhibits, on the left hand, a bisected sacrum, and on the right side a section of the pubis. The line *m n* is the horizon, *a b* the plane of the superior strait, and *o i* the plane of the inferior strait. The lines *p c*, *q c*, *r c*, *s c*, and *t c* also represent planes within the true pelvis, and it is evident by inspection that *a b* and *o i* are shorter than the lines *p c* to *t c*, because the sacrum is hollow, and is nearer to the pubis at its inlet and outlet than anywhere else. In this figure, the line *e f* is the axis of the superior strait, not the axis of the pelvis. The artist attempted to represent the axis of the pelvis by the line *g k*, which cuts all the planes in their centres. This is perhaps a very correct method of representation, but I greatly prefer that of Professor Carus.

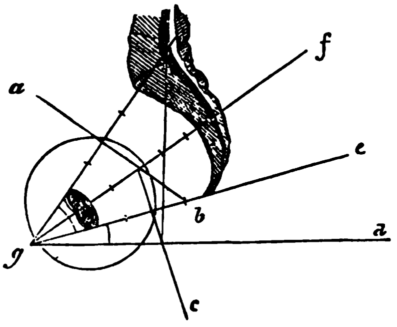
Fig. 14.



Carus's Curve.—A far preferable method of describing and understanding the axis of the pelvis is that proposed by Dr. Carl. Gustav. Carus, Prof. of Midwifery in the Medico-Chir. Acad. of Dresden. His views are stated in his *Lehrbuch der Gynækologie*, etc., Part I. p. 33, § 44.

Professor Carus directs that one leg of a pair of compasses should be set in the middle of the posterior edge of the symphysis pubis in a bisected pelvis, as in the figure 15, which I have copied from his plate —the other leg of the compass being opened two and a quarter inches (I propose two inches only), which is half the antero-posterior diameter of the pelvis. A circle may now be drawn downwards, commencing at the plane of the superior strait, and continued through *g f*, *g e*, and *g a* to the point of departure. This is Carus's circle, a segment of which represents, within the excavation, the axis of the pelvis. This

Fig. 15.



curve of Carus, which is the bent axis of the pelvis, is an imaginary curved line in coincidence with which the centre of the fœtal encephalon moves as it passes from the upper pelvis through the excavation, the inferior strait, and the produced genital aperture, in the act of being born. If the head of the child in a labor should continue to move, after its birth, in the same curve it moved in while within the pelvis, the head would come back to the point of departure at the centre of the plane of the superior strait. The line *a b* is the axis of the plane of the superior strait, and the line *g c* is that of the plane of the inferior strait.

Such is Carus's curve, which is the bent axis of the pelvic canal—an important item of midwifery knowledge; one without which a practitioner is incompetent scientifically to deliver a placenta, and far less to extract a child by turning, or to apply and deliver with the forceps or the crotchet. I caution the Student not to fail in understanding this point very perfectly. If he should make himself perfectly familiar with this curve of Carus, I see not how he could make any mistake as to the appropriate direction of his efforts in any act of delivery, whether with the hand alone, or with instruments.

Prof. Dubois, in his *Traité Complet de l'Art des Accouchemens*, p. 66, after speaking of Carus's curve and commending it as being very simple and at the same time very ingenious, says, it has the fault of giving a not exact idea of the central line of the pelvis ; but I consider that for all practical purposes it is far superior to any other, and I believe that the Student who well understands Carus's curve will always act correctly in his manner of adjusting the forceps and other instruments, as well as in operating with them, or with the hand alone, in extracting the head or other parts of the child, because he will clearly apprehend the line in which all movements ought to proceed.

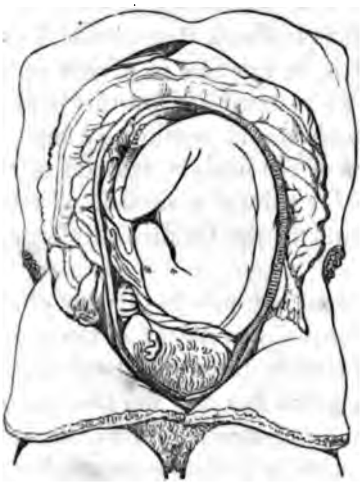
The straits, diameters, planes, axes, and curves of the pelvis are, in an obstetrical regard, related to a certain form, magnitude, and position of the presenting part of the child, which, in its passage through the pelvis, performs certain movements that are spoken of as the mechanism of the labor, and which I shall proceed to explain after I shall have first spoken of the recent pelvis, and of the child in utero.

The transverse diameter of the superior strait has already been seen to be four and a half inches, and that of the inferior strait only four inches, so that a series of planes superimposed from the lower to the upper strait would be wider and wider as they approach the top, being four and a half at top, and only four inches wide at the bottom.

This inclination of the sides of the pelvis, due to the position of the planes of the ischia, makes it inevitable for the head, when it happens to present transversely, to spin on its axis and direct its longest diameter at last to the pubis in front and the sacrum behind. If it were not that the ischial planes are thus inclined, there would be no rotation, nor any need for it; but as it is, rotation is almost indispensable. A gestation would hardly go to term but for this inclination: without it, the fruit of the womb would continually tend to drop down and be lost, in consequence of the upright attitude of the woman. It makes her parturitions more painful than that of other creatures, but her compensation is found in the Ovidian privilege of the *os sublime.*

A providential care has been manifested not only in this law of the inclination of the ischial planes, but is equally apparent in the planes of the pelvic canal. The Student has already been advertised that he ought not to adopt the notion that the pelvis has but the two planes; 1st. of the superior, and 2d. of the inferior strait; but rather, conceive of the entire pelvic canal from inlet to outlet as occupied with innumerable imaginary planes. Dr. Tyler Smith, in his *Lectures on the Theory and Pract. of Midwifery*, Lancet, No. XIX., vol. i. 1856, after remarking that only the upper and lower planes have generally been deemed worthy of particular attention, says, "but it is necessary to consider a third plane situated between the other two, and which may be termed the mid-plane," and he imagines this "mid-plane" to be specially interesting, as being the point "where the rotations of the head are impressed upon it." I have always considered that the flexed head in descending, commences its spiral or rotatory motion as soon as the occipito-frontal diameter begins to rest on opposite sides of the pelvic wall; that it descends rotating, and continues to do so until the crown of the head is pressed against the floor of the pelvis, when the rotation is, or rather, ought to be complete. Hence, I do not admit that there is, within the pelvis, any special plane, whether mid-plane or other that compels rotation. Indeed the whole trunk of the child, as well as the head, undergoes the spiral or rotatory motion, and it cannot be that so important a portion of the pelvic function depends upon the so-called mid-plane. I present in Fig. 16 an illustration to show that the child is packed up in shape like an olive, and presents its cephalic or head-pole to the opening. If the head must of necessity suffer rotation in its progress, the trunk must do so no less, for it is true that this olive-shaped mass, about to be driven through the pelvic canal, is some twelve inches in length by a little less than four inches in its transverse diameter. For many years past, I have taught at the Jefferson College that the planes of the pelvis are innumerable, and that each and every one of them must be traversed by the descending fœtus, at right angles to their superficies, and I am greatly obliged to Professor Carus for his simple and illustrative idea of the Carus curve, which saves me the useless trouble of calculating the places of the planes, and fully answers the demands of the age in the question, What is the axis of the pelvis? a question to which I have taught many thousands of American physicians to answer, it is Carus's curve, which is an arc of a vertical circle projected midway between pubis and sacrum, and which is the track in which the centre of the encephalon, or of the trunk of the fœtus moves in being born. It might well be called the pelvic orbit.

Fig. 16.



In my view it is pragmatical to pretend to lay down the absolute course of a line that should pass perpendicularly through an imaginary million of imaginary pelvic planes, and always in their exact centres. Such particularity is both useless and impracticable. The operator who adopts the idea of Carus's, or Camper's curve, when in the act of delivering, whether by turning, or with any instrument, has only to keep before him a clear view of Carus's arc, to be sure he is right in his direction of traction, and that, whether he be drawing the cranium through the plane of the superior strait, or through any one of the other planes that are inside of the pelvic canal, or in the extended, produced tube of the vagina, in which sometimes the head is still detained after clearing the lower strait. The accoucheur can always do this operation well, provided he has attained to a correct ideal of the pelvic canal, which he will know is in length equal to the height of the plane of the ischium, or about three inches and a half in all; for that is the measure of Carus's arc of a vertical circle projected within the pelvis midway between the pubis and the sacrum.

I must be allowed here to say a word concerning the plane of the inferior strait, as it is denominated. I myself have already used this word, and shall do so again, and many times, because I cannot escape from under the tyranny of custom and language. I wish, however, to protest now against the doctrine of a plane of the outlet as taught by most writers and public lecturers. The author just referred to, *loc. cit.*, speaks, as has been seen, of an upper or lower, and a mid-plane, but there is no such lower plane in fact; on the contrary, the outlet or lower strait is so shaped that there are two planes belonging to it, each nearly an equilateral triangle, and these two planes touch each other at an angle of 90° along the transverse diameter of the inferior strait. The posterior plane descends forwards from the point of the coccyx, its two sides being bounded by the inner lips of the sacro-sciatic ligaments as far as the transverse diameter. The anterior plane descends backwards from the crown of the pubal arch until it meets its fellow, and forms with it, as I said, an angle of about ninety degrees. The child, in being born, displaces these planes, if one might suppose such a thing, pressing the anterior margin of the posterior plane downwards, and dividing the anterior one into two rectangled triangles that yield or open in the middle like winged valves to admit of the child's escape, and then close again. It seems to me that as I have a right to imagine a plane or planes of the inferior strait, there is an attached privilege to conceive of them as valvular.

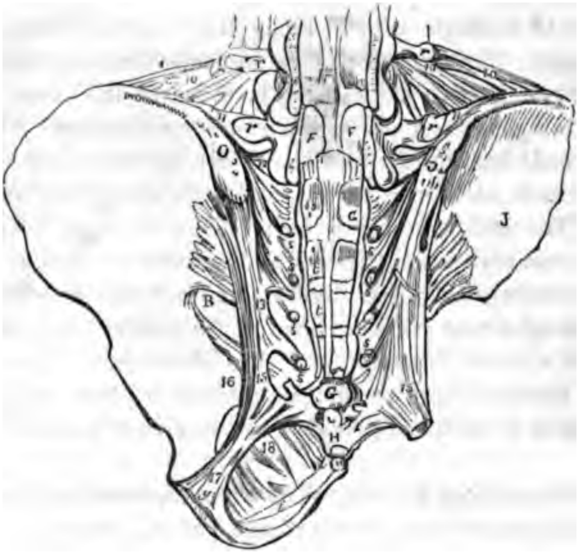
Ligaments of the Pelvis.—The two symphyseal ends of the pubes are, as I said, united by a fibro-cartilage, passing interchangeably from one bone to the other. The lower edge of this ligament is called the triangular ligament. It serves both to strengthen the joint and to depress the crown of the pubic arch, which arch is thus made cushion-like and lower, and elastic. If the head were pressed immediately against the bony structure, that structure, from its inelastic hardness, would contuse the soft parts of the woman or those of the child; whereas the ligament is of the nature of a soft and elastic cushion.

In dividing the symphysis, there is sometimes, not always, found in the centre of it a very small synovial sac.

The ligaments of the pelvis are of very great importance, for the firmness of the pelvis as an organ for transmitting the weight of the trunk to the lower extremities, and propagating their motion inversely to the trunk and upper limbs, is dependent upon the ligaments. I shall present the reader here with a view of them taken from a distinguished author, who, I hope, will not object to my exhibiting to the American Student a copy of his beautiful drawing. I refer to Dr. Frederick Arnold, from whose *Tabulæ Anatomicæ*, Fasciculus IV. Pars II. *Continens Icones Articulorum et Ligamentorum*, fol. Stuttgard, 1843, I have taken Fig. 17.

In this figure the letter G is the sacrum; *s s s* the posterior sacral foramina; H the os coccygis, J the right os innominatum, of which a portion has been removed, O the posterior superior spinous process of the ilium, B the greater sciatic notch; 10 the superior ilio-lumbar ligament; 11 inferior ilio-lumbar ligament; 12 superior sacro-iliac ligament; 13 the posterior superficial sacro-iliac ligament; 15 sacro-sciatic ligament: 16 the sacro-spinous ligament; 17 the sacro-tuberous ligament.

Fig. 17.



From a mere inspection of Dr. Arnold's figures it is evident that the chief ligamentous strength of the sacro-iliac junction depends, 1st, upon the powerful ligaments on the back part of the pelvis, outside of the excavation; and 2d, on the firm cohesion of the two ossa pubis by means of the strong inter-pubic ligament. The auricular or sacro-iliac cartilage, which is not represented, is so strong that I have been much foiled in endeavoring, before my class, to tear open the sacro-iliac joint by pulling asunder the ossa pubis after I had performed the section of the pubic ligaments: the origin or insertion of the auricular cartilage must be torn out from the bone before it will yield, for the fibres will not break: they can only be torn out by the roots.

Opening of the Joints.—Many people among the mass of society suppose that in every labor the joints become relaxed in order to let the child pass through the bones; and a good many ladies daily take a spoonful of oil of olives or castor oil, with a view to promote this desirable relaxation, as they esteem it to be. I have known a young thing take the trouble, nightly, to anoint the mons veneris for a long period with lily ointment, to soften the joint.

It is understood, however, by the anatomist, that these joints do not become open and relaxed as a normal effect of gestation, of labor, or of any endermic or therapeutical measures, resorted to for that end. Yet they do, in some persons, relax, to their great injury or inconvenience, and cases of this kind are recorded in the books, and will be met with by most persons extensively engaged in the practice of midwifery.

As to the symphysis pubis, I have on many occasions found it to be quite loosened, and admitting of motion. One of my patients, whom I have succored in many of her confinements, has generally suffered from the relaxation of the symphysis pubis during the several last weeks of her pregnancies. The articulation becomes so loose as to make a very considerable cracking sound whenever she would turn in bed, or walk; and she has been good enough, in order that I might verify the fact, to allow me to cause the motion by pressing with my hands on the opposite spinous processes of the iliac bones, by which means I could cause the two opposite pubes to approach or separate from each other, or ride up and down, passing each other in the direction of the length of the symphysis.

When the patient, in such a state of the inter-pubal ligament, stands on the right foot, the right pubis rises upwards, while the left descends, and *vice versâ*—so that the act of walking is not only attended with pain, but with tottering and uncertainty.

The lady in question gives birth to children weighing ten and twelve pounds, but she has commonly recovered from the relaxation within about forty days after the birth of the child, and her pubic joint then remains perfectly strong and efficient, until, in the next gestation or lying-in, the pressure or the infiltration come to loosen and dispart the bones again.

This lady has been fourteen times pregnant, and has given birth to twelve children at term. The joint did not give way until the sixth accouchement, which occurred October 20, 1833. The child weighed upwards of twelve pounds. The motion of the symphysis was very obvious, and quite painful. She recovered from it, however, and did not feel it again until near the close of a pregnancy, which was concluded on the 12th December, 1835, by the birth of a son. In about a month the articulation was again as firm as ever. A daughter was born October 30, 1837, which reproduced the relaxation. She soon got over this, and in the next pregnancy and confinement felt nothing of it: this labor was on the 2d of September, 1843. When the child was three months old, the relaxation took place, and was long troublesome. She was again pregnant in 1845, but had no return of the inconvenience in the gestation or lying-in, which occurred January 20, 1846. The joint gave way again soon after her last accouchement, August 17, 1847: she discovered it on the 20th day of the month, and it was so movable, that a cracking sound was produced by turning in bed.

The Student will readily perceive that a considerable relaxation of the pubal joint cannot fail to coincide with a relaxation, more or less considerable, of at least one of the sacro-iliac junctions, and that in such case the pain, weakness, or constitutional disturbances developed by the accident are readily accounted for, and can be treated wisely at least, if not fortunately. It appears to me that in articular maladies or accidents of this sort, there is but one sound principle of cure, and that is absolute rest in a recumbent position. A woman could hardly fail to recover if kept quiet in bed for a long time. She could hardly recover while taking usual exercise, which is wholly incompatible with the cure of the injured articulation. In those cases in which the joint has become positively inflamed and painful, it would be useful to apply leeches, cups, or blisters, or use anæsthetic topicals, as chloroform, belladonna, opium, or aconite. I have found every attempt at bandaging a failure, on account of the impossibility of well adjusting and properly retaining a bandage in place in this particular part of the body, so that I am obliged to conclude that the best thing that can be done is to go to a protracted rest in bed.

Diameters of the Pelvis.—As every woman's hand, foot, or chin is not like every other woman's, so there are, perhaps, no two pelves that are exactly alike. For the utilitarian purposes of clinical midwifery, it is enough, therefore, to know that as children's heads and trunks are supposed to be of a mean weight and bigness, so ought the pelvic canal to be of an average capacity for their transmission. Different authors give us different means of these pelvic diameters, and it is, perhaps, of no very great importance that they should exactly agree together in their several estimates of size. In order to reach what would be the average of ten different pelves, I measured ten of those in my collection at Jefferson College, and the result was as follows in this tabular view, which I subjoin:—

	SUPERIOR STRAIT.			INFERIOR STRAIT.	
No. of Pelves.	Antero-Posterior.	Transverse.	Oblique.	Antero-Posterior.	Transverse.
1	4.2	6.	5.3	4.	4.3
2	4.4	5.5	5.5	3.6	4.4
3	3.9	4.8	4.7	2.7	4.2
4	3.5	5.	5.	2.9	4.3
5	4.2	5.	4.8	3.1	4.6
6	4.3	4.6	5.5	4.1	4.6
7	4.9	4.7	4.8	4.1	4.1
8	4.3	4.5	4.3	4.1	3.8
9	4.4	4.8	4.9	3.6	4.7
10	4.3	4.8	4.7	3.8	4.2

For the ten antero-posterior diameters in this table, the mean was a little more than four inches and two-tenths; the ten transverse diameters gave me 4.79 inches, and the oblique diameter 4.45 inches and one-tenth; and these may be taken as correct, because those diameters do not change much in drying. As to the inferior strait, which I measured from the point of the coccyx to the crown of the pubal arch, less correct results can be expected, because in drying it generally happens that the shrinking or contraction of the sacro-sciatic ligaments draws the point of the coccyx forwards towards the arch. Even with this consequence, the ten antero-posterior diameters gave a mean length of 3.7, whereas the true expression ought to be, as it is in the recent subject, more than four inches—say four and a half in some subjects, though rarely. The ten transverse diameters of the lower strait were 4.32. I shall not cite from the authors the collected tables of pelvic diameters, because I prefer not to load the Student's memory with such matters, feeling sure he will know how large a pelvis is, and ought to be, when he knows how large a child's head is or ought to be. For my own part, I do know that an American child's head ought to be three inches and eighty-eight hundredths wide, measured through the parietal protuberances; and such is its transverse diameter. Its occipito-frontal diameter should be four inches and ten-twelfths, and its occipito-mental diameter five inches and a half.

In order then that an American should be born in quite a normal way, his mother's superior strait ought to be four inches in antero-posterior, four and a half inches in transverse, and five inches in its oblique diameters. Such a pelvis as that is proper for easily transmitting any properly developed fœtus, provided it should present itself aright in the labor.

Let the Student then learn that the superior strait has four diameters to be measured; one from the pubis to the promontory, which is four inches; one from the middle of the brim to the opposite brim, which is four inches and a half; and two others, called oblique diameters, from each sacro-iliac junction to the opposite acetabulum, which are five inches long in each. For the inferior strait let him measure two diameters only, one from the pubal arch to the point of the coccyx, four and a half inches; and the other across the outlet from one tuberosity to its opposite fellow, which is four inches in length.

It is of great importance to have correct views of the depth of the female pelvis, and nothing is easier than to obtain them by considering that a symphysis pubis is from top to bottom an inch and a half long, which gives the depth of the pelvis behind its anterior wall as one inch and a half. The planes of the ischia are three and a half inches high, and, therefore, the depth of the pelvis at the side and all across to the other side—that is to say, its middle depth—is three inches and a half. The sacrum is four inches long, and the coccyx is an inch and a half, which equal five inches and a half, the depth of the pelvis on its posterior wall; so that the pelvis is an inch and a half deep in front, three and a half at the sides and in the middle, and five and a half inches deep behind. The magnitude or dimensions of all the things that are within the pelvis may be estimated by comparing them with these diameters, and as an object that is four inches high cannot be vertically placed within the pelvis except it be near its posterior wall, so, one only two and a quarter inches high can be, like the non-gravid womb, completely within the pelvis, no part of it rising or projecting above the plane at the strait.

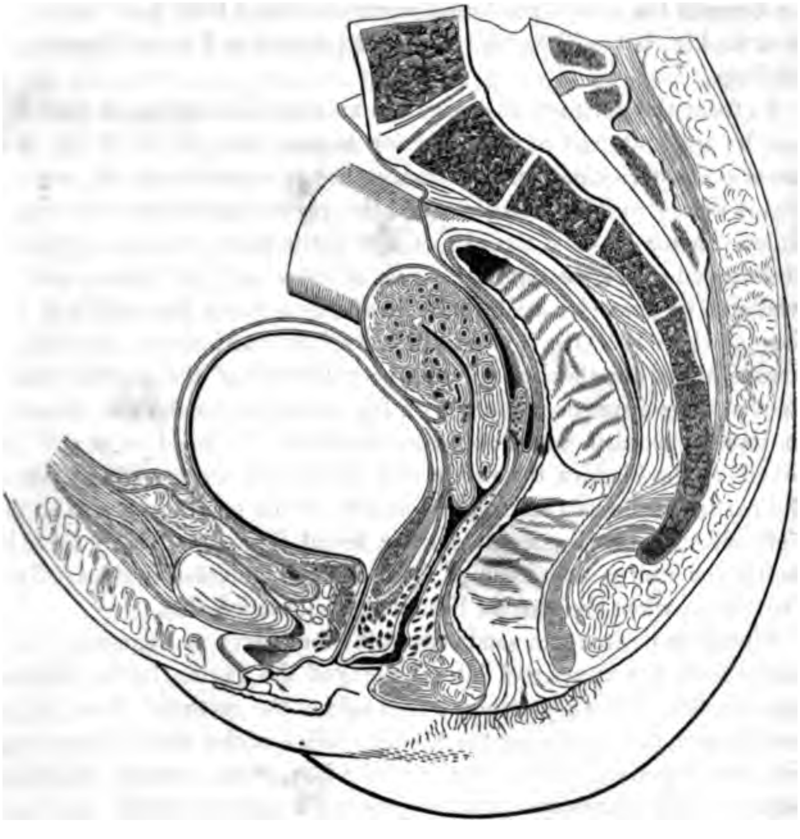
The *recent pelvis*, which is represented in Fig. 18, is exhibited as a cross section, the body being cut in two from front to rear to show the relative positions and forms of the viscera.

The drawing has been reduced for this work from the admirable engraving that accompanies Dr. Kolrausch's work, entitled *Zur Anatomie und Physiologie der Beckenorgane.*

It appears to me that this is the most instructive illustration that I have ever met with in books on midwifery, and it is to be entirely confided in for its correctness. The subject was a young girl of 21 years of age, who committed suicide while menstruating. The specimen was prepared in such a way as to enable Dr. Kolrausch to see it while lying in a bath of alcohol covered with a glass plate. Looking downward through a diopter firmly fixed 24 inches above the glass plate, Dr. Kolrausch, using a pen dipped in printer's ink softened with oil of turpentine, drew every one of the lines with the utmost exactness on the intervening plate of glass—seeing them through the diopter; so that they could not, perhaps, be more correctly taken by a photograph. The copper-plate was copied from the drawing.

To the right is the buttock covering the bisected sacrum, in front of which is the rectum, which has been opened by the incision. On the left, behind the os pubis, is the bladder of urine with its urethra.

Fig. 18.



Between the bladder and the rectum is the tube of the vagina surmounted by the uterus, whose summit or fundus does not rise quite so high as the plane of the superior strait. The womb rests upon the upper end of the vagina, which incloses its cervical or neck portion and keeps it up in its place by means of its connection with the bladder in front and the rectum behind, and more than all by means of two utero-sacral ligaments which tie the upper ends of the vagina and the womb to a certain place about an inch and a half in front of the apex of the sacrum. I may here say, that as long as the utero-sacral ligaments remain in a healthy state, preserving by their tone a due length, the womb cannot fall downwards or prolapse, because the cervix, being inclosed within the upper end of the canal of the vagina, it cannot move down unless that upper end of the vagina move down also, which, as above said, it cannot do except the ligamenta utero-sacralia give way first. The length of the vagina determines the height of the womb's place in the pelvis. All these intro-pelvic organs are covered up beneath the serous peritoneal membrane as if they were enveloped in a napkin, but still exhibit their magnitudes and forms beneath its foldings.

In front the peritoneum covers the anterior hemisphere of the bladder, its top and part of its posterior surface, but not all of it. The lower or posterior part of the bladder lies in contact with the vagina, and is united to it by what is called the vesico-vaginal septum or partition. After leaving the vagina the peritoneum proceeds to invest about one-half of the anterior aspect of the womb, its fundus, and the whole of its posterior wall, as far down as to about the middle of the cervix, where it leaves it to continue its downward course, in which it invests about one-third of the uterine extremity of the vaginal canal; then turning upwards it mounts on the rectum to inclose that intestine in its serous coating, and so passes up above the brim or strait. In investing the bladder, the womb and vagina and the rectum, as above, the peritoneum sends off to the left side of the pelvis, and also to the right side, its two ligamenta lata or broad ligaments which serve to steady the uterus and keep it from falling against the sides of the excavation when the woman lies on this side or on that.

The same peritoneum sends two folds that serve as ligaments backwards from the upper and lateral parts of the vagina to be inserted into the face of the sacrum on either side of the rectum. Now, as the peritoneum, after covering the hinder surface of the womb, goes on to and rises up along the rectum and the face of the sacrum, these two peritoneal folds or utero-sacral ligaments form the sides of a *cul-de-sac*, that looks like a deep pocket between the gut and the womb, and which is called Douglas' *cul-de-sac*, a thing of much import because it is the place into which the fundus uteri falls when it is quite turned over backwards, or retroverted. Let the Student, therefore, comprehend that the hinder wall of Douglas' *cul-de-sac* is the rectum and sacrum; its front wall is the womb and upper posterior end of the vagina, and its right and left walls the right and left utero-sacral ligaments. I wish him to know this point well, on account of its concern in retroversio uteri and in prolapsion of the bowels; but more particularly because I wish him to bear it in constant remembrance whenever he may be thrusting the blade of a forceps upwards at the risk of bursting a way into it; for when passing the forceps upwards, in a labor, he is very liable to force its point through the thin and distended vagina quite into the peritoneal sac, an accident that would be almost sure to kill his unfortunate patient.

Besides the organs now enumerated, the pelvis contains the obturator muscles and the large levator ani muscles, which descend like converging rays of a fan from the antero-lateral walls of the pelvis below the brim, and are inserted so as to lift or raise the end of the rectum and even the perineum upwards, so that not the rectum and perineum only, but the whole of the pelvic contents are directly or indirectly held up and sustained by these muscular organs. The stronger and more muscular the levatores ani the deeper is the sulcus betwixt the nates, and, in general, the better sustained are the contents of the basin. In the young and vigorous the sulcus is very deep; in the aged and the feeble it descends lower and lower or opens out, so that in very old or exhausted people the perineum becomes actually protuberant or convex.

Within the recent pelvis are numerous bloodvessels and nerves, supplying the contained organs, besides large bundles of nerves that come from the sacral foramina and soon leave the cavity, passing outwards through the ischiatic notches to form the great sciatic nerve.

Here also are contained the ureters; while, overhanging the brim, are seen the psoas muscles, which seem to lessen the transverse diameter of the upper strait. Let the Student be particular to note the place and appearance of the psoas muscles as they pass along the brim of the pelvis; and let him observe that, when a woman, who has recently been delivered, suffers from inflammation of the womb, she always experiences pain when she draws up the knees, because the overhanging bellies of the psoas muscles, in contracting to flex the thighs, press very painfully upon the inflamed globe of the uterus, which still juts up above the plane of the superior strait, filling up the whole of its transverse diameter.

Fig. 19.

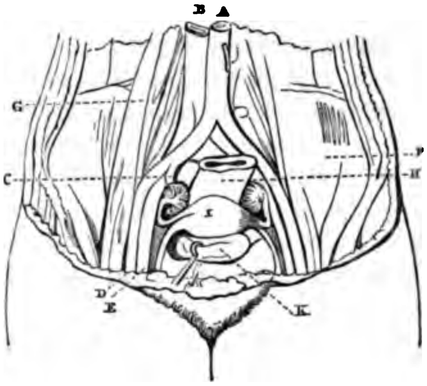


Figure 19 may give some idea of the relation of parts in the recent pelvis. A is the aorta, and B the vena cava; C the internal iliac artery descending into the pelvic excavation; D and E are the external iliac artery and vein; F G the psoas muscles, H the rectum, I the womb, and K the bladder of urine.

I wish the Student to reflect that all the pelvic viscera are within, and not out of or beyond the pelvis; and I say so in this place to guard him against the very common mistake of supposing that any part of the womb—its fundus—is to be found jutting up above the plane of the superior strait. There are few drawings made to illustrate the inner genitalia *in sitû*, that do not exhibit the fundus uteri on a level with or even higher than the plane of the strait. Kolrausch's most beautiful and admirable plate, the most perfect that has yet been produced, gives to all the internal organs their absolute right place. I assure the Student that whensoever he shall find that he can feel the fundus uteri by pressing his hand upon the hypogastrium and pushing the teguments downwards and backwards, he may make sure that he is touching a womb enlarged by pregnancy or by some disease.

CHAPTER II.

MECHANICAL INFLUENCE OF THE PELVIS.—OF THE MECHANISM OF LABOR AS DEPENDENT ON THE RELATIONS OF THE CHILD'S FORM TO THAT OF THE PELVIS.

VERY little seems to have been anciently known concerning what is now called the mechanism of labor as observable while the head or other parts of the child are passing along the canal of the pelvis. No one can doubt that Mauriceau and Lamotte, who were keen observers, must have often noticed the spiral movements of the advancing head or breech in cases of labor, for it is impossible that such circumstances should have wholly escaped their notice, or that of many other highly talented practitioners of our art. Nevertheless, it is very certain that they have nowhere given any clear account of the act of rotation, and I believe that it is now almost universally agreed that we are under obligations, for the first statement concerning it, to Sir Fielding Ould, of Dublin. That gentleman, in 1748, published "*A Treatise of Midwifery, in three parts,* by Fielding Ould, Man-Midwife." Lond. 8vo. pp. 203. Ould gives an account of the matter in his Preface, p. xvi., saying: "And to this end, I hope that the description of the head coming towards the world, with the chin turned to the shoulder, will be of very great advantage;" and he tells us of a case that occurred to him while he was in Paris, in which he seems to have obtained some obscure notions concerning rotation. His promulgation of the doctrine of rotation may be found, such as it is, at page 28: "When a child presents itself naturally, it comes with the head foremost, and (according to all authors that I have seen) with its face towards the sacrum of its mother, so that, when she lies on her back, it seems to creep into the world on its hands and feet. But here I must differ from this description in one point, which, at first sight, may probably seem trivial: the breast of the child does certainly lie on the sacrum of the mother, but the face does not; for it always (when naturally presented) is turned either to one side or the other, so as to have the chin directly on one of the shoulders."

In the next paragraph, which is on p. 29, Sir F. Ould explains his notions of the causes of the head's obliquity, and though he had no very exact perceptions of the facts, it is doubtless to him we should look as the pioneer in this particular section of our obstetrical labors.

Since the date of Sir Fielding Ould's publication, the views of the profession upon the mechanism of labor, in so far as the volume and form of the pelvic canal and those of the fœtal head are concerned, have become quite settled, and it is not difficult to set it in such a light as to make it easy of comprehension for the Student. To this end, I ought to say that the gravid womb at full term is about twelve inches in length from the os to the fundus, and from seven to eight inches across at the place of its greatest breadth. A child in utero generally presents its head to the orifice, and as its whole length is from eighteen to twenty inches, it cannot possibly lie stretched out at full length in a space of only twelve inches long. Hence the fœtus is doubled up or flexed in all its limbs as well as its trunk, so that it may be said to rest within the womb in a state of universal flexion. The whole trunk is bent forwards; the neck is so bent forwards as to cause the chin to rest upon or near to the breast which serves to point the apex of the head or vertex to the opening; the arms, forearms, and hands are flexed, as are also the thighs and legs. Doubled up in this way the mass of the fœtus is olive-shaped, the cephalic pole being downwards, and the pelvic pole upwards. The drawing (Fig. 16), to which I here refer, exhibits very correctly this flexed state of the child in a vertex presentation.

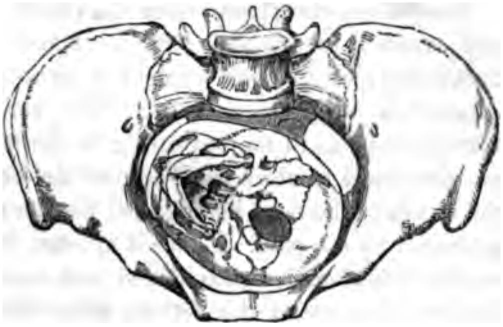
A vertex presentation is one in which the head-pole presents flexed. If the head-pole should present not flexed it would not be a vertex presentation, but it might be a presentation of the crown of the head, of the forehead, or of the face, and whether one or the other of these three, would depend on the degree of departure of the chin from the breast. The chin in a vertex presentation must be at the breast, because the head is flexed, or bent forward. When the head is not flexed, but on the contrary is extended, it is the crown that presents, or the forehead, or lastly, the face.

A great majority of children in labor present by the vertex, and the most of them direct the vertex to the left side, while the forehead is to the right side of the pelvis; but in these cases the occipito-frontal diameter crosses the pelvis obliquely from the right sacro-iliac synchondrosis to the left acetabulum.

The superior strait is four, four and a half, and five inches in its antero-posterior, its transverse and oblique diameters. The child's head is 3.88, 4.10, and 5.5 in its biparietal, occipito-frontal and occipito-mental diameters. The spinal column juts forwards like a half column or pilaster so as to overhang the superior strait like a promontory at the sacro-vertebral angle as well as far above it. Hence it is that the biparietal diameter of the child adapts itself to the short diameter of the superior strait, while the occipito-frontal diameter coincides with one of the longer ones, and so it happens that the head comes into the strait obliquely, or as above said with its vertex to the left acetabulum, and its forehead to the right sacro-iliac junction, thus crossing the strait diagonally.

I say diagonally, for, although it be true that a child may descend through the plane in a direct position, *i. e.* with its vertex, or its forehead to the pubis, such direct positions are rarely to be met with; and clinical experience shows that, in the immense majority, the head sinks below the plane with the occipito-frontal diameter coincident with the oblique diameter of the upper strait, as in Figure 20.

Fig. 20.



The fœtal head usually descends through the plane of the abdominal strait in flexion, *i. e.* with the chin to the breast, the vertex being turned towards the left acetabulum, while the bregma, or upper part of the forehead, points towards the right sacro-iliac symphysis: *vid.* Fig. 20. The occipito-frontal diameter is probably nearly coincident with the plane of the strait in the beginning of most labors, whence it appears that the occipito-mental diameter must dip its occipital extremity beneath the plane.

In proportion as the presenting part descends lower and lower, the dip of the occipital pole of the occipito-mental diameter increases. It must be so, since the occipito-frontal diameter could not descend horizontally into a pelvis too narrow for it. That diameter which, by my averages, is 4.10, could not, without a dip or see-saw, sink into the lower part of a pelvis whose transverse diameter, low down in the excavation, does not considerably exceed four inches.

The deeper the head plunges into the cavity, the more strongly is the chin forced against the breast, or, in equivalent terms, the greater the flexion of the head.

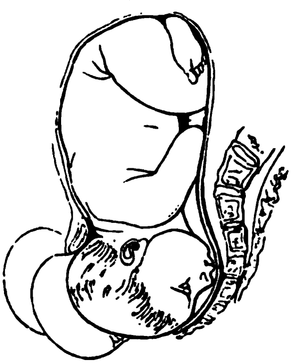
Now, let the Student reflect, that the two sides of the pelvis, I mean the planes of the ischia, are inclined towards each other in such a manner that the lower limits of them are half an inch nearer to each other than their upper margins, for the lower strait is only four, whilst the upper one is four and a half inches wide. If the Student will make this reflection, he cannot fail to perceive that this head, placed obliquely or crosswise at the top of the pelvis, must turn on an axis or spin round so as to adapt its short diameter to the shortest diameter of the canal, and its longest one to the longest. In other words, the head must turn or spin round, or, as it is said, rotate within the pelvis. This rotation is caused by the resistance the vertex meets with when forced by the labor-pain against the left ischial plane, which is so inclined that the vertex, which cannot bore its way into or through it must glance off from it, and so move in a forward direction or towards the pubal arch.

Every succeeding pain drives the vertex lower, increases the flexion, and causes it to glance or slide more and more to the forepart of the excavation; or, to speak technically, to rotate more and more until its rotation is fully accomplished. This act of rotation, in which the vertex, that was in the beginning to the left, or near the acetabulum, has now come to place itself behind the pubis, is not completed until the crown of the head has reached the floor of the pelvis, and is forced against it by the pain. Hence it appears that a child's head enters the pelvis in flexion, descends flexed and rotating until the rotation has become complete at the bottom, where the flexion begins to lessen, because the pain pushes the floor of the pelvis down by thrusting the head upon it, which slides along that yielding floor, and emerges under the crown of the pubal arch. The resistance of the floor of the pelvis (*perineum*) is so great that the occipital bone of the head is forced by it upwards between the rami of the pubis, and kept close to the arch. Meanwhile the floor (perineum) being thrust further and further down, the head continues to glide upon it and turn over backwards, losing more and more of its flexion, and acquiring more and more its extension, until at last, having become wholly extended, it escapes from the organs and is born, passing outwards with the sagittal suture lying along the middle of the floor, and the middle of the occipital bone resting exactly beneath the lower end of the symphysis pubis.

If the whole perineum could be cut away with a bistoury, I could suppose the child's head might come forth from the lower strait without any extension, and with the chin still at the breast; but the pains really thrust the sagittal suture in its whole length, indeed the entire crown of the head, against the elastic resisting perineum and posterior vaginal wall. The efforts, being often repeated, serve to push the perineum away from the crown of the pubal arch to let the vertex escape under it; but, while the perineum is pushed off by this force, the same perineum jams the occipital bone of the child firmly against the crown of the arch; so that, as the vertex emerges from the genital orifice, the os occipitis is pressed close to the symphysis, first at its lower edge, and next on its outer or front aspect. The cranium of the child is born as soon as the extension is complete, but not until then.

Figure 21 exhibits the manner in which the vertex touches the inner surface of the crown of the arch when the rotation is complete. The faint lines show how it rolls out under the edge of the triangular ligament, and also how it next rises upwards in front of the outer surface of the symphysis, the head turning over backwards as it emerges.

Fig. 21.



Restitution.—As soon as the head is born, it begins to rotate back again, outside of the pelvis, to the same point or direction it had upon first engaging within the pelvis. Its originally oblique position becomes restored, and this, which is the last act of mechanism, as to the head, is called the restitution.

Mechanism of the Shoulders' Delivery.—The cause of restitution is to be sought for in the state or position of the shoulders.

When the vertex is at the left acetabulum, the right shoulder is at the right acetabulum, and the left one at the left sacro-iliac synchondrosis: but the inclined plane of the right ischium repels the descending right shoulder, pushing or sliding it downwards, forwards, and to the left, until it comes to the symphysis pubis. The left shoulder meanwhile falls into the open chasm of the hollow of the sacrum that yawns to receive it freely.

This rotation of the shoulders, or, in other words, rotation of the trunk of the body, causes the act of restitution of the head, which, being already born, must turn coincidently with the rotation of the shoulders.

Such is the act, or rather such is the succession of acts, commonly called the mechanism of the head, in a labor in which the vertex presents in the first position. I shall now recapitulate them as predicated of a vertex presentation in the first position.

1. FLEXION.—The head becomes flexed; the chin going to the breast. It enters the pelvis obliquely, with the vertex to the left acetabulum.

2. ROTATION takes place as it descends, because of the repelling resistance of the plane of the left ischium, the lessened resistance under the arch, and the incurvation or hollow of the sacrum.

3. EXTENSION commences under the upward pressure of the perineum, and continues to increase until the child is born.

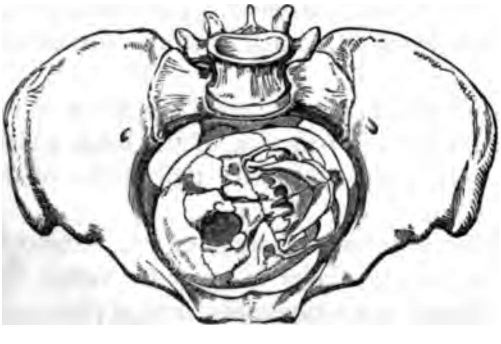
4. RESTITUTION allows the vertex to seek its original oblique direction, as it goes back again towards the left acetabulum.

In treating of labors, and the conduct of them, I shall have numerous occasions to refer to, and further explain, the mechanism of the delivery of the fœtal head.

Mechanism of Labor, with Vertex in Second Position.—In this labor the vertex is at the right acetabulum. In saying that the vertex is at the right acetabulum, it is not intended to convey the idea that the posterior fontanelle is always directed absolutely against the acetabular region. Experience will soon teach even a young practitioner, that the child retains in early stages of labor the ability to rotate its head right or left, and that it generally exercises this faculty very freely, spinning its head upon the cervical spine so as to turn the vertex sometimes quite close to the symphysis pubis, and then whirling it back to the top of the ischium, or even as far backwards as the ilio-sacral junction. As the cranium, however, plunges deeper and deeper into the excavation, it becomes so tightly held that these sudden motions cease, and it only moves in the direction impressed upon it by the mechanics of the pelvis.

The processes by which the vertex in a labor of the second position, as in Figure 22, is brought forth, are the converse of those I have described as taking place in cases of first position. The flexion is followed by the rotation as the head sinks low into the cavity; the vertex being repelled towards the left by the inclined plane of the right ischium.

Fig. 22.



As soon as the posterior part of the summit of the head reaches the perineum, the perineum, while it yields before the descending power, thrusts the occiput firmly upwards against the crown of the pubal arch, as in the first position. The extension or reversion of the head being completed by its expulsion, restitution then follows by carrying the vertex to the right acetabulum, outside, and the face to the left thigh. The left shoulder turns to the right and forward to get under the arch, while the right shoulder goes back to the sacrum, and so the shoulders are delivered; sometimes, however, the pubal shoulder is the first, and sometimes the sacral one is the first to be expelled.

Third Position.—The mechanism of the head, when the vertex presents in the third position, differs from the two just before described, only in the absence of the second act, the act of rotation.

These third positions are very rarely observed; and it is probable that, when they are met with, they depend upon a peculiar form of the superior strait.

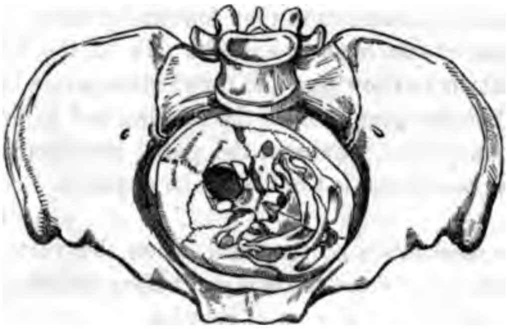
I possess some pelves in which the antero-posterior diameter of the superior strait greatly exceeds the length of the transverse or oblique diameters. In such a pelvis it is obvious that the vertex would be more likely to present itself at the pubis than at either acetabulum. In an ordinary conformation of the superior strait, a third position of the vertex presentation is extremely unlikely to occur, since, long before the commencement of the labor, the prominence of the lumbar vertebræ, and the overhanging promontory of the sacrum, would be almost sure to turn off the rounded forehead of the child into the right or left sacro-iliac region; and this the more probably, inasmuch as the oblique being greater than the antero-posterior diameter, it affords an easy and inviting accommodation to the usual oblique mode of engagement. The three positions that have here been spoken of comprise the occipito-anterior positions of the vertex. They are those I have been accustomed to enumerate in the following order, viz: first, second, third; or vertex-left, vertex-right, and vertex-front positions.

We have next to describe the fourth, fifth, and sixth; or forehead-left, forehead-right, and forehead-front positions of the vertex presentation.

Fourth Position.—In the fourth position, the occipito-frontal diameter crosses the pelvis obliquely, as it does in the first position, with this difference, that its frontal extremity is at the left acetabulum, and its occipital pole at the right sacro-iliac junction. See Fig. 23.

This is a true vertex presentation; and it must not be mistaken for a presentation of the forehead. It is a true vertex presentation, because the chin is close to the breast, and there is no departure; on the contrary, the flexion is, perhaps, even stronger than in the occipito-anterior positions.

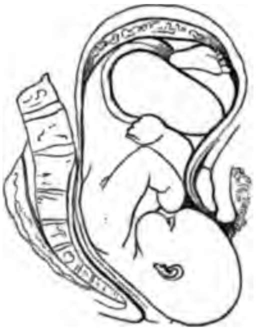
Fig. 23.



The mechanical form of the pelvis is so miraculously adapted to the wants of the economy in labor, that it has full power, in a major part of these fourth positions, to rotate the vertex from the right sacro-iliac junction to the right acetabulum and thence to the pubal arch; and that without any assistance given by the accoucheur.

It is true that this favorable rotation does sometimes require the aid of the hand, or even of an instrument, as shall be described on the proper occasion. It also occasionally happens that neither the hand alone, nor any instrument can enable the surgeon to bring the vertex round to the front. In such case, it slides into the hollow of the sacrum, and the labor is thenceforward rendered more painful and more difficult. When, in fourth positions, the vertex can rotate first to the acetabulum and then to the arch, the labor is not seriously retarded, and the mechanism thenceforth is the same as has been already treated of and described; but when the posterior fontanel gets into the hollow of the sacrum, and will not suffer rotation, then the flexion must become greater and greater as the fontanel slides down along the point of the sacrum, over the face of the coccyx, and down the mesial line of the perineum, until, having thrust away the perineum 4.10—the occipito-frontal diameter—the vertex slips over the fourchette, and immediately turns over backwards, in strong extension towards the woman's back. This allows the forehead, eyes, nose, mouth, and chin successively to emerge from underneath the crown of the pubal arch, to complete the birth of the head. The annexed figure (24) of a head in an occipito-posterior position shows these truths clearly enough.

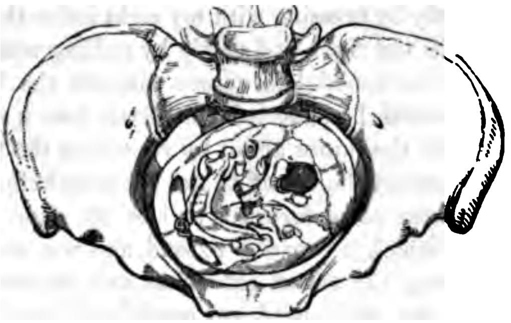
Fig. 24.



Such is the mechanism in all cases of birth in occipito-posterior positions, failing rotation to the front; and the Student will clearly understand that it must be so, since the length of the line from forehead to vertex is too great to permit it to be otherwise.

Fifth Position.—The fifth position, as in Fig. 25, is that in which the vertex is to the left iliosacral space, and the forehead to the right acetabulum. Here, as in the fourth position, the mechanical form of the pelvis tends to turn the vertex first towards the left acetabulum, and thence to the arch.

Fig. 25.



Sixth Position.—The sixth position finds the vertex at the promontory of the sacrum. Madame Boivin met with only two such positions in 19,614 cases.

I have seen a greater number of sixth positions than were met with by that celebrated midwife, although the labors witnessed by her so greatly exceed in number all that I have seen.

While the facts stated in her tables are to be relied upon for their historic accuracy, her statistical results cannot be admitted as the law of any practitioner's future experience. My own practice, for example, which has been a private practice, has shown me a far greater number of sixth positions than her vast clinical experience, in an immense lying-in hospital, brought to her view. Madame Lachapelle saw no such case.

A case of vertex labor in the sixth position occurred to me this day, of which I made the following note, in order that I might set it down here as a freshly remembered experience.

Case.—*July* 8, 1848, 10½ A.M. Mrs. E—— I——, Pine street. This is the sixth child; a male, born fifteen minutes ago. The pains commenced moderately, at 4 P.M. yesterday, July 7. Mrs. I. has been in pain at regular intervals all night. I arrived at quarter past nine, one hour since. The os uteri was nearly dilated; membranes unruptured. The anterior fontanel was touched through the membranes just behind the upper half of the symphysis pubis. By a strong pressure, I could conduct the index finger along the sagittal suture directly toward the sacrum, until I felt the triangular fontanel, leaving no doubt of the diagnosis. The left shoulder was at the right, and the right shoulder at the left ischium. The occiput was opposite to the top of the third segment of the sacrum; the flexion of the head was strong.

Partly by pressing with my right index the right temple and zygoma towards the right, and partly by pulling with the same finger the right leg of the lambdoidal suture towards the left side of the pelvis and downwards, I converted this sixth into a fifth position. I now discharged the liquor amnii by rupturing the bag of waters. The next pain rotated the vertex to the left acetabulum or first position, whence the vertex came forwards and to the right until it reached the arch, under which it began to extend, and was soon expelled.

During the act of extension and expulsion of the head, and just before the whole head was completely born, an act of restitution commenced; as soon as the head was free, the vertex went round again left-wards to the sacrum, and the chin of the child rested with its under surface upon the front of the pudenda, the face looking upwards.

This happened because the shoulders had not rotated at all, but plunged into the pelvis, the left one at the right, and the right one at the left ischium.

With the next pain the left shoulder came to the arch, and the right one to the sacrum, and so they were delivered. The child was about seven pounds in weight; in good health.

Here, then, was a clearly marked case of sixth position, notwithstanding which, the mechanical force of the pelvis and its strange adaptation to the form of the cranium, permitted me, with very slight assistance, to convert it into a fifth, and then into a first position. This rotation was fortunate for the mother; since, by effecting it, I prevented the necessity of a dilatation equal to the occipito-frontal circumference nearly, and thus rendered necessary a dilatation equal merely to the bi-parietal circumference; the former being nearly fifteen inches, while the latter is not more than twelve inches.

August 4, 1856. I attended a labor last night, in which the child presented in the sixth position. I touched the ossa nasi behind the top of the pubis, yet the pelvis rotated the head, and the vertex came to the front, and was easily born.

Face Presentation.—When the head presents in extension instead of coming down in flexion, we have presentation of the forehead, or of the face. If the extension be moderate, the forehead presents; if it be very great, the face presents. When the face presents, it always comes down with the chin to one side, and the top of the forehead to the other side of the pelvis; and afterwards rotates the chin to the pubis or to the sacrum. In the case (Fig. 26), the chin is to the right ischium and the forehead to the left ischium. The natural movement of the mechanism would gradually turn this chin to the front of the pelvis, and the top of the forehead to the sacrum, as in Fig. 27.

Fig. 26.

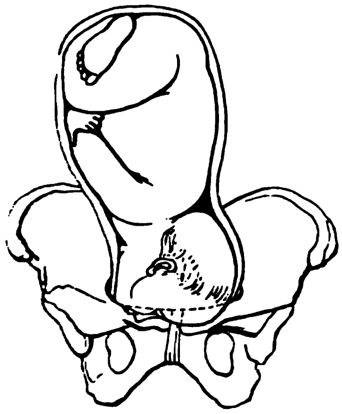
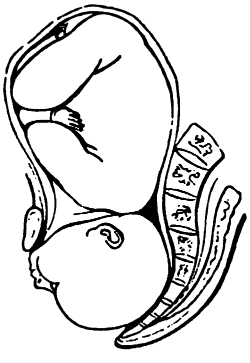


Fig. 27.



In face presentations, the chin must be born first; see Fig. 27. Here observe, that from the chin to the vertex is more than five inches, while there is no diameter five inches long to be found within the true pelvis. Hence, if the mental extremity of the occipito-mental diameter descends into the cavity before the occipital extremity, it must escape first from the outlet in order to allow the occipital extremity to escape last, and *vice versâ.*

There are many cases of face presentations that appear to afford remarkably easy deliveries, and to require no aid from the hand. In all those, however, where assistance is demanded, there is an important doctrine, one that should never be lost sight of in the conduct of the cases. The doctrine is this—Bring the chin to the pubis. The figure may show that, if the chin be brought to the pubis, it will have to sink only an inch, or an inch and a quarter lower than the brim, in order to get below the level of the crown of the arch: as soon as it reaches that point, it comes out beneath the arch, and thus the mental extremity of the occipito-mental diameter begins to be born. When this first step is effected, the whole length of that diameter is soon expelled, or, in other words, the whole head is born; its occipital extremity being the last portion to emerge from the ostium vaginæ.

Should any one, in practice, forgetting this doctrine, bring the forehead to the pubis, he would do a great wrong; for, as the chin must be born first, and the occiput last, the chin will have to slide along the whole length of the sacrum five inches; and over the extended perineum two and a half or three inches before it can escape; but, to do this, it will be required that the head and half the thorax of the child shall be together jammed within the excavation; for from the chin of the child to the top of its sternum are not eight inches. Such a position is almost sure to demand an embryotomy operation for the delivery of the fœtus.

CHAPTER III.

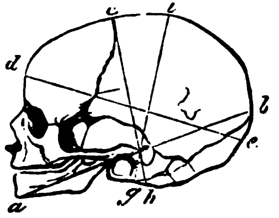
OF THE CHILD'S HEAD AND OTHER PRESENTING PARTS.

The study of the form and dimensions of the child derives its importance from the relations of the fœtus to the bony pelvis, through which it is destined to pass in the act of parturition.

To know the form and magnitude of the head, as related to the pelvic canal, is of the highest importance; and, indeed, no man should be looked upon as a qualified practitioner who suffers himself to remain ignorant of every particular of the matter now referred to.

The fœtal cranium, divested of the bones of the face, closely resembles in form an ostrich egg, upon the side of the lesser pole of which the facial bones are adjusted.

Fig. 28.



In the figure of the fœtal head which is annexed (Fig. 28), it is evident that if the bones of the face were removed, the remainder of the cranium would be oviform; as I have on different occasions shown it to be, by removing those bones in presence of my class at the Medical College.

In looking at the head from above downwards, as in Fig. 29, the bones of the face are out of sight, and the cranium is evidently egg-shaped, the greater pole being at the occiput, while the lesser is at the forehead.

The fœtal head (Fig. 30) is copied with the camera from a cast of a fœtal head, and gives a proper idea of the true form when covered with its integuments: the child perished in the labor, its head being too large to pass through the straits without the aid of the forceps.

The longitudinal diameter of this oviform skull has, by most authors, been computed at four inches, and its conjugate at three inches and a half; both of which calculations are considerably under the mark of truth, as I have found by careful measurement.

The bones that enter into the composition of the skull, excepting the face pieces, are the os occipitis, the two ossa parietalia, the os frontis, the two ossa temporum, and the sphenoides. These are the bones that make up the principal bulk of the object, for the face bones do not add very considerably to the magnitude of the mass.

Fig. 29.

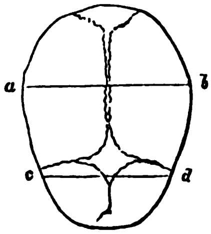
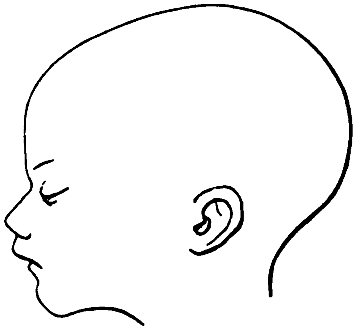


Fig. 30.



The face bones are the maxilla inferior, the maxilla superior, the ossa malarum, ossa nasi, ossa palati, and the vomer. It seems hardly necessary to mention the ethmoides and the ossa unguis.

In a new-born child, the process of ossification is not completed, and the edges of the cranial bones are not locked or dovetailed together by the serræ of the adult suture; whence it happens that the cranium is not a fixed magnitude or form, but liable to alteration under the pressure of the parts through which it is driven by the great force of the labor-pains.

A great advantage is found in this mobility of the cranial bones, in certain instances in which the pelvic circumference is too small, either absolutely or relatively; for, the child's head of four inches in its conjugate diameter may, by the pressure, become reduced or wire-drawn so as to pass through a superior strait of only three and a half inches, or even less; and that without injury to the head, which, as soon as it has escaped from the pressure, begins to recover its normal form again.

There are, however, to be met with many specimens of the fœtal cranium so solid and firm in their ossification as to yield not at all in labor, which is then rendered both more painful and difficult. The young practitioner therefore should, in difficult cases, take comfort from discovering by the touch that the fœtal head is of a yielding nature, and hence not likely to resist too long the moulding or modelling efforts of the throes.

Size of the Fœtal Head.—In the fœtal head at term, of which there is a drawing at Fig. 30, we are in the habit of imagining certain lines called diameters, which are represented in Fig. 28. There is a line traced from the chin *a*, to the vertex or point of the head or occiput *b*, called by the English writers the oblique diameter, but which the French authors have induced us, of late, to denominate occipito-mental diameter, a phrase that explains itself. The next one is the line from *d* to *e*, called the occipito-frontal diameter, as indicating the distance from the occiput to the most salient point of the forehead. After this comes the perpendicular diameter, from *c* to *h*; and lastly, in Fig. 29, the transverse or bi-parietal diameter, which passes from one parietal protuberance to the other, from *a* to *b*; and the temporal diameter, from *c* to *d*.

As to these diameters, I have never deemed it expedient that the Student should charge his memory with all of them; yet he ought to know that the occipito-mental diameter is above five inches in length. He ought to know this, in order that he may also know that such a diameter cannot be see-sawed, or reversed, after the head has once fairly entered into the excavation, in which no space exists large enough to render such a change possible. If the extremity *b* descends first, it must escape first, or be returned above the superior strait; and if the extremity *a* descend first, it must escape from the inferior strait first, or be returned above the linea ileo-pectinea, in order to be there see-sawed.

The occipito-frontal diameter *c a* is four inches and ten-twelfths of an inch in length—a diameter too considerable to admit of its being see-sawed in the excavation, except under very extraordinary circumstances, for there is, in general, not space sufficient for that end.

I speak with very great confidence as to the above estimate, for I have carefully measured and recorded the size of three hundred crania of mature children that I received in the course of my obstetric practice. The Student will be in error if he adopts the common estimate of the authorities, which is too low at four inches.

In a single series of one hundred and fifty heads, I found the occipito-frontal diameter in fifty-two of them to exceed 5 inches. In 11, it was $5\frac{1}{12}$th; in 8, $5\frac{2}{12}$ths; in 3, it was $5\frac{3}{12}$ths; in 1, $5\frac{4}{12}$ths; in 1, $5\frac{6}{12}$ths; in 2, $5\frac{7}{12}$ths; and in 1, $5\frac{10}{12}$ths.

The sum of my occipito-frontal measurements was seven hundred and twenty-nine inches and seven-twelfths of an inch for one hundred and fifty crania. The mean was four inches ten-twelfths. The sum of the bi-parietal diameters of the said one hundred and fifty crania was five hundred and eighty-six inches and seven-twelfths—the mean, three inches and eleven-twelfths of an inch.

The bi-parietal diameters exceeded four inches in sixty-eight of the children. In 19 it was 4.1; in 5 it was 4.2; in 6, 4.3; in 3, 4.4; in 1, 4.5; in only one case was it less than 3.6, the usual estimate, and in that case it fell to 3.4.

A paper containing statements of the above series was read by me at the centennial celebration of the Amer. Phil. Society, on the 25th May, 1843, and was published in the *Proceedings*, &c., vol. iii. p. 127.

I measured one hundred and twenty-six occipito-mental diameters of neonati at term, of which the sum was six hundred and ninety-nine inches and five-tenths, so that the mean or average of the one hundred and twenty-six diameters was five inches and a half. I know no one who has measured so many, and I am sure that greater accuracy is not to be attained by any person.

Upon these grounds, therefore, I am to inform the Student that the occipito-mental diameter of the fœtus is five inches and a half, the occipito-frontal four inches ten-twelfths, and the bi-parietal three inches eleven-twelfths.

The above statements ought to show that it is not a matter of small moment whether the head presents in labor by the vertex, the crown, or the forehead.

Upon the presentation depends the circumference of the advancing body; if the vertex presents, we have a circumference equal to thrice the bi-parietal diameter, which would equal a circle of eleven inches and three-quarters in circumference. The occipito-frontal diameter would give a circumference of upwards of fourteen inches, while the occipito-mental circumference would not be much under sixteen inches.

Fontanels.—The bones of the head are divided from each other by the sutures. In Fig. 29, showing a top view of the skull, may be seen the sagittal suture, a straight line which extends from the middle, and sometimes from the base, of the os frontis backwards, to the upper angle of the occipital bone, where it appears to divide, branching into the two legs of the lambdoidal suture. In passing from the forehead backwards, this sagittal or arrow suture crosses the transverse or coronal suture, and at the place of crossing there is a large vacuity, as to bone, which is occupied, however, by the skin and by strong membranes which constitute what is commonly called the mould of the head—technically, the anterior fontanel, the great fontanel, the frontal fontanel, or the bregma. It is of various size in different specimens. When the ossification is precocious, it is small; in the contrary case it is large, and sometimes it is found to be very large.

At the posterior terminus of the sagittal suture is found the posterior fontanel, often called the occipital fontanel.

There is a very great difference between the anterior and posterior fontanels; the former being quite large, quadrangular, and yielding to the pressure of the finger; the latter being so small that it can only be distinguished by the three suture lines that radiate from a common centre. Let the Student carefully learn to make this discrimination; for, if he should not do so, he will in practice find himself embarrassed in his diagnosis of the two fontanels.

Too much care can hardly be bestowed upon the mastering of these two points; nor can one become too familiarly acquainted with the differences between them; for, in trying to ascertain the precise position of any head-presentation, the accoucheur always seeks to place his index finger upon one or the other of these openings. It is clear that they must serve as points of departure in an exploration—for, if the index finger be in contact with the posterior fontanel, and the place that finger occupies in reference to any fixed point in the pelvis be well understood, the surgeon ought thence to deduce the very place of any and every other part of the cranium of the fœtus. To know where the fontanel is, is to know where to conduct the hand, the forceps, the perforator, or the crotchet.

It has been seen, in a preceding page, that the various positions assumed by the head when it presents in labors are enumerated as first, second, &c., and that they are determined by reference to the point on the pelvis to which the posterior fontanel is addressed.

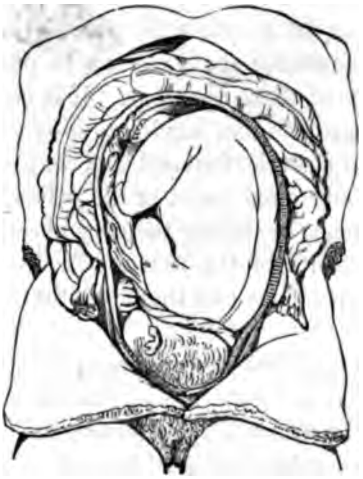
Presentations.—The Student who shall have made himself master of the subject of the pelvic diameters is now enabled to appreciate the differences that arise in labors exhibiting various presentations and positions of the head. He knows that the bi-parietal circumference of the head is not too great to admit of its ready transition through the excavation—and he as clearly understands that the occipito-frontal or the occipito-mental circumference would prove too large for the canal. Therefore, in any case of delay or difficulty, he would provide for effecting a coincidence of the bi-parietal circumference with the planes (of the excavation) through which it must necessarily pass.

If the pelvis be only four inches in its antero-posterior diameter at the superior strait, the occipital pole of the occipito-frontal diameter must dip so as to allow the vertex to descend, and thus become the presenting part. In fact, the fœtus lies so packed up in the womb that it is truly said to be in a state of universal flexion—the legs being bent upon the thighs, the thighs upon the trunk, and the arms and forearms and whole spinal column in flexion—so that even the head is found to be flexed on the neck as a normal condition of the fœtus in utero.

The form of the flexed fœtus is like that of an olive. One pole being directed to the fundus, and the other to the os uteri, gives thus two distinct, primary presentations—one cephalic, and the other pelvic, as shall be more clearly shown by and by.

The drawing exhibits very naturally the usual presentation and position of a child at the beginning of a labor. It represents the womb opened, with the fœtus in what is called a vertex presentation in the first position; *i. e.*, the posterior fontanel is turned towards the left acetabulum of the mother's pelvis, and the vertex, or occipital pole of the cranium, dips sufficiently to allow of its entering the pelvis through the plane of the superior strait.

Fig. 31.



The drawing also shows how very much the spinal column is curved. It is manifest that, if pressure should be made upon the pelvic extremity of the column, in a direction from above downwards, it would be still more considerably bent—it would be an elastic resisting arch, and the outward thrust of the cervical extremity of that arch would tend to flex the head, more and more, in proportion to the increasing violence of the thrusting effort, so that the lower the head descends, the more must the chin be pressed against the breast, and the more perfect the coincidence of the bi-parietal circumference with the planes of the excavation through which it happens to be passing.

Unfortunately, the occipital extremity of the occipito-frontal diameter does not always dip, and the frontal extremity of it is sometimes found to be the dipping pole. In such an instance, the chin is said to depart from the breast, and we discover a presentation of the crown of the head, of the forehead, or even of the face, the head in the last-named case becoming completely extended, instead of descending in flexion. But the account of these accidents must be deferred until we come to treat of those special presentations, which we hope to be able fully to explain and describe.

The child at full term is about nineteen inches in length. Specimens are occasionally met with of children twenty-one inches high; but they are rare.

The average weight of a new-born child is somewhat above seven pounds; very many of them weigh eight pounds; and it is by no means a rare occurrence to find a child weighing nine, ten, eleven, and twelve pounds at birth.

I have never seen one yet that weighed fourteen pounds. The largest one I have weighed was thirteen pounds and a half avoirdupois. The mother soon afterwards perished with inflammation of the womb and bowels. To witness the birth of such a monster is appalling. I have heard of children of seventeen, and even of eighteen pounds' weight at birth. Such relations always lead me to suppose that some mistake has occurred in weighing the infant. M. Velpeau shrewdly remarks that children of that weight are children of three months old, and that such magnitude is impossible at birth. My own clinical experience, which has been very abundant, has never enabled me to see a child of fourteen pounds' weight at birth.

The head of the child exceeds, in its smallest circumference, the circumference of the thorax and shoulders, of the abdomen or the hips: wherever the head can pass, there will, therefore, be space for the transmission of the natural body.

The length of the child, folded up in the womb in flexion, is about eleven inches from the summit of the head to the lower extremity of the pelvis or buttocks.

In about forty-nine out of fifty cases of pregnancy, the head is at the os uteri—in one out of fifty cases, the pelvis is at the os uteri, giving us the breech, feet, or knee presentation.

When the head presents in labor, it is to be supposed that it has presented during the entire gestation, and *vice versâ.*

The vulgar notion that the child lies in the womb with its head to the fundus until labor is about to commence, and then turns its head downwards to the mouth of the organ, in order to escape head-foremost, is erroneous—for the child is eleven inches long, and cannot turn itself in a womb only seven or eight inches in conjugate diameter. If, in like manner, the breech presents in labor, we infer that it has presented for many months antecedent to the commencement of the parturient efforts: cross presentations are rare events.

Hippocrates said the child packed up is in shape like an olive in a narrow-necked flask: if one or the other pole of the olive presents itself at the aperture, it may escape; otherwise, it must be turned or broken, or the flask must be broken, in order to extract it.

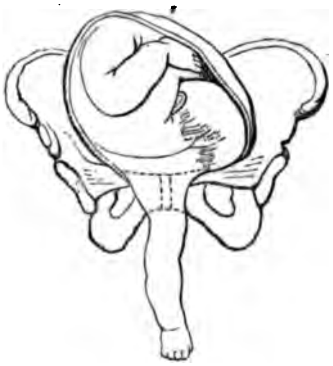
The same is true in midwifery. Either the cephalic or the pelvic pole of the fœtal oval must descend, in order to its birth; and it is a matter of little moment which should be the pole, whether the cephalic or the pelvic, all other things being equal.

Upon the whole, the head presentation is the most favorable for both mother and child, since nature provides that its frequency shall be in the ratio of forty-nine to fifty.

Two Presentations only—Cephalic and Pelvic.—Rigorously speaking, there are but two presentations in midwifery: one of the head, Fig. 31; the other of the pelvis, Fig. 33. The idea expressed in the word Presentation, is one relative to the part of the fœtus that comes to the opening; while the idea conveyed by the word Position, refers to some relation betwixt a cardinal point on the walls of the pelvis, and a cardinal point on the presenting part. Thus, in the pelvis, the cardinal point is always the left acetabulum—on the head, the cardinal point is the vertex or the chin. On the breech, the cardinal point is the sacrum of the fœtus. For the shoulder presentation, the cardinal point is the whole head of the child.

As to the head presentation—it may deviate, and allow a shoulder to come to the os uteri: but this is a mere accident of a cephalic presentation: an accident that has arisen from the impinging of the head upon the margin or brim of the pelvis, whence it has glanced upwards to the iliac fossa, permitting the shoulder to take its place. This is to be seen by inspecting the cut, in which the child's head, which originally presented, has deviated, and gone above the plane of the superior strait, lodging itself in the left iliac fossa, while the shoulder has come to the strait, and allowed the arm to prolapse.

Fig. 32.



The cut may serve to show how the hand and arm have merely prolapsed; making what is commonly denominated an arm presentation: but is it not clear, the head having gone up, that the shoulder still really presents, and that the arm has only fallen down or prolapsed?

From the above, it appears that we have—

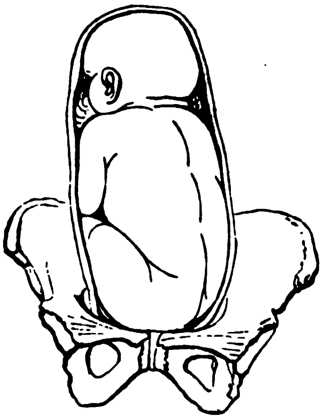
1st. Cephalic presentations;

2d. Cephalic presentations deviated, with descent of the shoulder; and, lastly,

3d. Cephalic presentations deviated, with descent of the shoulder, and prolapse of the arm.

Here is a drawing representing a breech presentation, or presentation of the pelvic extremity of the fœtal oval. This is the second normal presentation of the child, the cephalic being the first. In this case, an accidental deviation might cause the buttock to glance upwards on the brim of the pelvis, to take its lodgment in the left iliac fossa. Such an accident would give rise to a footling labor, or to a presentation of the knees.

Fig. 33.



A footling presentation, then, is only an accident happening in the course of a pelvic presentation—and the same may be said of the knee cases, which are very rarely met with.

I recommend these views of presentations to the Medical Student, who, if he should adopt them, will find his notions of midwifery greatly simplified, and his memory not loaded with useless divisions and descriptions that serve only to embarrass him as a student and perplex him as a scholar or practitioner. These are the divisions I have proposed in my public lectures; and, having found them convenient also at the bedside, I with confidence advise him to prefer them to the long catalogue of presentations in the books. Knowledge in its nature is simple, pure, not complex; it owes its seeming complexity and abstruseness only to man.

If the Student should ask me where I will place the presentations of the belly or the back of the fœtus, I cannot inform him, for I do not know whether they be derived from deviations of the pelvis or from deviation of the head. I am sure, however, that all such cases are accidents either of the cephalic or of the pelvic presentation, which is the essential point.

Positions of a Presentation.—The word position, as I said, refers to a relation between a certain cardinal part of the presentation, and a certain cardinal part of the pelvis. Thus, in vertex presentations, the posterior fontanel may be in the fifth position, that is to say, the occiput of the child may be directed to the left sacro-iliac junction, and its forehead to the right acetabulum; but the cardinal point on the pelvis is the left acetabulum, from which we count the first, second, third, fourth, fifth, and sixth positions.

Care should be used to avoid confounding the terms presentation and position.

A vertex presentation is one in which the head presents in flexion. A face presentation is one in which the head presents in extension.

There are six positions of the vertex presentation:—

1st. Vertex to the left acetabulum.
2d. Vertex to the right acetabulum.
3d. Vertex to the symphysis pubis.
4th. Vertex to the right sacro-iliac junction.
5th. Vertex to the left sacro-iliac junction.
6th. Vertex to the promontory of the sacrum.

There are two face positions:—

1st. The chin to the right side of the pelvis.
2d. The chin to the left side of the pelvis.

There are four positions of the pelvic presentation:—

1st. Sacrum to the left acetabulum.
2d. Sacrum to the right acetabulum.
3d. Sacrum to the pubic symphysis.
4th. Sacrum to the promontory.

In the shoulder presentations there are four positions—two positions for each shoulder.

First RIGHT-SHOULDER-position; the head is in the left iliac fossa, the face looking backwards.

Second RIGHT-SHOULDER-position; the head is in the right iliac fossa, the face looking forwards.

First LEFT-SHOULDER-position; the head to the left, looking forwards.

Second LEFT-SHOULDER-position; the head to the right, looking backwards.

These being the principal presentations, with their several positions, I shall enter into fuller details of them when I come to treat of the special labors in which they require to be managed by the accoucheur.

CHAPTER IV.

THE EXTERNAL ORGANS.

THE word **Pudenda** expresses the idea of those parts of the reproductive apparatus that appear upon the outer surface of the pelvis. The expression mons, or mons veneris, refers to the elevation or fleshy prominence lying upon the ossa pubis, which, because they project to the front, are called shear bone or shear bones. The mons becomes still more prominent than it would be from the mere advance of the horizontal or body-portion of the pubis, in consequence of a quantity of adipose substance that lies below the skin there, and which, together with a quantity of hair that covers the whole surface, has caused it to receive in ancient times the appellation of mons. The skin and cellular tissue found in this region, the great abundance of hair-follicles and numerous sebaceous glands disposed there, render the mons subject to attacks of diseases of various kinds, such as abscess, folliculitis, &c., and it might well be supposed that furuncular inflammation affecting so dense and resisting a texture must give rise to very severe pain. I must say, however, that during a practice of little short of half a century, and a large clientage among sick women, I have never been called to treat any abscess or other inflammation of the mons; whence I suppose the cases to be rare.

The symphysis of the pubis is about one inch and a half or perhaps in general rather more in length, and it is only the upper portion of the symphyseal aspect of the bone that is covered or concealed by the lower portion of the mons veneris; the lower two-thirds of the bone being invested with tissues that are covered with mucous membrane lying inside of the vulva or genital fissure. The skin or derm therefore that covers the mons passes downwards on either side of the symphysis leaving the genital fissure or sulcus bordered on the right and left by the labia majora, or greater lips of the pudenda. These labia are covered with ordinary cutis on their exterior surfaces, but are lined with mucous membrane on their inner aspects; passing downwards and backwards, they are at length lost or disappear in the perineum. As in the human lip, the outer skin gradually and insensibly changes into mucous membrane, the line of demarcation between them being undiscoverable. Like the mons, the dermal surface of the labia major is covered with hairs and supplied with numerous sebaceous glandules. They have a store of adipose cells, though a less copious one than the mons above them. The areolar tissue lying betwixt the dermal and mucous surfaces of the labia is very loose and distensible, and yields quite readily to an injecting or lacerating force. Hence it happens that women attacked with dropsy, or those who are much infiltrated with œdema gravidarum, are commonly found to complain of great distension, and sometimes of very painful hardness of these labia. They are found, on occasions, to swell to the size of a stout man's arm, and now and then are observed to be so firm and solid that they feel excessively hard and will not yield except to long-continued pressure.

The student who reads this paragraph ought to understand that when a pregnant woman has her legs distended enormously with the serum of an œdema gravidæ, she is very likely, at the same time, to have œdema labii majoris, which she will not complain of on account of her delicacy of sentiment. It is truly a matter of slight concern provided the œdema be slight; but not so when the legs are swollen so as to look more like an elephant's limb than like a woman's ankle. I advise him under such circumstances to inquire about it, and if she admits that she is very much swollen and has some pain in the part, to insist upon examining by touch. If a woman having both the labia very much swollen, should fall into labor, it is to be expected that the powerful efforts of the womb will push the child's head against the distended labia, and, by repeated efforts of the pressure, squeeze the serum out of the areolar cells or meshes, until at last they yield enough to let the child be born. I may even inform the student that this good success is to be generally looked for, though not always. Such a state of the woman's health is not always the most favorable to an easy parturition, and it now and then happens that he may be called upon to expedite the birth by using his forceps; in which case the student may find the most serious embarrassments in his operation. To lock the forceps upon the child's head, the part just above the junctura or lock must be pushed back towards the axis of the lower strait; but how can he push the junctura backwards against a perineum that has become by this infiltration as hard as a board? The infiltration of the labia does always affect the perineum more or less, and I assure the student that I have been completely foiled in my attempts to adjust the forceps by this very cause. I remember particularly the case of a poor Irish woman thus affected, in whom neither Dr. Dewees nor I could succeed in applying the instrument, and in which by that great teacher's advice I was led to deliver the dead child by embryulcia. These remarks I now make for the purpose of persuading the midwifery Student to consider what ought to be done in cases of labial œdema of pregnancy, and advising him to insist upon his privilege to examine the patient, and, if proper, to let the serum escape by means of punctures in the labium. Such an operation gives very little pain, and is not followed by any evil consequence. It ought not to be omitted where the part is greatly distended, and somewhat painful. It is better to do it before the patient falls in labor, though it is very well to perform it even while she is so, provided the swelling should in any considerable degree seem to oppose the delivery, which it sometimes is known to do. If a sharp-pointed lancet held betwixt the finger and the thumb is allowed to project about one sixteenth of an inch, and the swollen labium is turned well outwards, the point may, by several rapid blows, be struck through the mucous membrane into the areolar tissue of the labium, whereupon the serum immediately begins to exude from the punctures, and continues to flow out until the part is quite collapsed and softened again. The youngest beginner in practice need not hesitate to take this step.

Labial Thrombus is an accident that happens mostly to women in labor, though women in other circumstances might be affected with it. During the great distension and strain to which the genitals are exposed in parturition, a branch of the ischiatic or pudic artery may be ruptured, whereupon a rapid extravasation takes place, and the blood is forced into the meshes of the cellular tela of the labium, or even lacerates it and occasions great cavities to be formed that are filled with fluid or with clotted blood. When a labium thus becomes injured during the process of childbirth it is not always discovered by the complaints of the woman, who is generally incapable of discriminating between one kind of pain and another in the superabounding sources of agony with which she is surrounded. The discovery is, for the most part, made by the medical attendant, while touching for the diagnosis or prognosis. If, indeed, a woman goes into labor without having any abnormity of the labia, and becomes affected with considerable and very tense swelling of one of them, the *prima facie* inference should be that thrombus of the labium has occurred, and it should at once be investigated.

When the bloodvessel gives way in the labium the extravasation is not always of necessity very great, but sometimes a great many ounces are driven hastily and with great injection-force among the loose internal textures of the part, which become black and swollen to the size of a man's arm. If the extravasation should continue, there is reason to apprehend that not the labium only, but the areolar tissue inside of the pelvis, might become infiltrated, so as to dissect the internal structures to a dangerous extent. Any such risk as this can be obviated only by permitting the hemorrhage to have a free outlet by opening the labium by a free incision. It is very reasonable to make such an aperture, were it but to let out the fluid blood or serum and allow of the coagula to be turned out with a finger passed into the cavities. Hence, when an incision is made, it ought to be large enough to admit of the introduction of the finger. I have turned out many ounces of coagulated and fluid blood and serum by such an incision, and the evacuation has allowed the distended lip to collapse immediately. A child could not be born in such circumstances without rupturing the swollen labium, and adding greatly to the mischief.

I do not suppose that all the cases of thrombus are due to laceration of a pudic or ischiatic artery; it is very probable that those instances in particular, that occur during or subsequently to deliveries with forceps are caused by rupture of one of the bulbs of the vestibule, to be hereafter described. The bulbs are excessively vascular, and so much exposed to injury by the blades of the instrument that one has more occasion for surprise at their exemption than at their injury in the operation.

Thrombus of the labium is, for the most part, discovered after the conclusion of the labor and not before, because most of the accidents of rupture do take place while the child is passing through the external organs. I conclude, also, that post-partum thrombus is a less serious matter than that which happens before the head comes to press the external parts strongly outwards. But, in either case, the blood should have an outlet by means of the incision, which should be made on the mucous and not on the external aspect of the labium. I wish here to be understood as advising the incision only in such instances as may, without question, require it. In very slight degrees of extravasation the removal of the infiltration may be safely left to the absorptive powers of the parts.

Abscess of the Labium, like abscess in any other part, may be treated by antiphlogistic methods, provided suppuration has not taken place already. I believe that physicians will very rarely have anything else to do in labial abscess beyond the exhibition of emollient cataplasms or fomentations, to be followed by the discharge of the pus by means of the lancet or bistoury. Few women can be found who have moral courage enough to allow them to expose such a cause of alarm and distress in the early stages. Their modesty leads them to conceal their pain until it becomes insupportable, and then it is too late to expect that any measures whatever shall be able to effect a cure by resolution. The only thing then to be done, is to soothe the pain by emollient and opiated dressings, and to discharge the pus as soon as its fluctuation is made manifest. The incision is to be made on the mucous surface, and not on the outer aspect.

There is great liability to make a mistake in the diagnosis of these labial abscesses, which ought not to be confounded with a disease of the excretory duct of a Duverney's gland. But, as this is not the proper place to speak at length on that case, I shall postpone any further consideration of it to a future page.

The superior angle of the vulva is its anterior commissure, and the lower or posterior one its posterior commissure. The symphysis is one and a half inches long at least, and yet the posterior commissure is to be found about on the level of the arch of the pubis, not below that level; so that, when a child's head or trunk is coming out under the arch and is distending the vulva to the utmost, this posterior commissure is thrust away from the arch to a distance equal to the diameter of the plane of the distending head, which is generally not less than ten, and sometimes fourteen inches in circumference. To obtain this degree of dilatation, the labia must become greatly strained and elongated, so that they sometimes break short off near the lower end, whereupon the child is instantly and violently ejected. The proper way to eschew so considerable a misfortune, is to support the perineum, and oppose the escape, while exhorting the woman to desist from all voluntary efforts to drive the child from her womb.

The Nymphæ, which are called labia minora and labia interna, lesser lips and inner lips, are seen to be two folds of the inner mucous membrane, like two flaps or valves. Near to, but a quarter of an inch below the superior commissure, the nymphæ meet, and after covering the clitoris like a hood, whence the part is called prepuce of the clitoris, they descend, each in an outward direction to about three-fourths of the whole length of the labium, where they are lost in the general plane of the surfaces. They are excessively vascular bodies, and are by some persons supposed to be erectile, which I do not admit to be true. They have been supposed to have the office of furnishing material for the ampliation of the orifice when undergoing the distension usual in childbirth, an idea which is as unfounded as the former one. I have, on many occasions, touched the ridge of the nymphæ when the head was passing out, and found it firm and undeployed. Probably the real function or office of the nymphæ is to draw the glans of the clitoris downwards, and force it into strong contact with the dorsum penis in coitû, which, by increasing the friction of the glans or tentigo, must greatly increase the sexual feeling or orgasm of the congress. Such orgasm, probably, is one of the indispensable agents of fecundation, since without it the oviducts or Fallopian tubes would lie flaccid and relaxed within the pelvis; whereas, when highly wrought up by the sexual orgasm, they are known to erect themselves, and apply their fimbriæ or ingluvies to the ovaries for receiving any ova that may chance to be ready to enter their orifices.

Vestibule.—As the nymphæ divaricate in descending along the inner aspects of the labia, they leave a triangular space, terminated below by the crown of the arch just beneath the meatus urinæ or orifice of the urethra. It is the duty of the Student to study this vestibulum upon the subject, and to learn that it is to serve as his director in the operation of catheterism. It has a sort of raphe or raised line in the middle. If the index finger of the left hand is first applied to the crown of the arch, and then slid upwards, it will separate the nymphæ and go up near to the top of the triangle. If the pulp of the finger is now slowly moved downwards again towards the crown of the arch, it will feel the little dimple made by the urethra's orifice, and then the point of the catheter may be immediately introduced into the urinary passage without vexing the woman with vain oft-repeated trials, and without being obliged to call for lamp or candle, as I have witnessed, to the mortification and humbling of the patient, and the great scandal of medical skill and proficiency.

Cohesion of the Labia.—In young children, it not unfrequently happens that the inner face of the labia pudendorum becomes irritated, which produces an adhesive inflammation, uniting the surfaces that are in mutual contact. The inevitable evacuation of the bladder will, of course, always prevent a union of the whole extent of the labia.

In all the instances of this kind that have fallen under my notice, I have found it sufficient to separate the cohering surfaces by forcing them apart with the fore and middle fingers of the left hand, while, with the end of a probe, drawn down directly upon the line of union, the adhesions are readily destroyed, and that without occasioning the least bleeding. The scalpel has never been required. In performing this operation in a good light, it will be seen that the union of the surfaces has taken place by the mutual interlocking of very delicate villi, much in the same way as the placenta and cotyledon of the sheep or cow are interlocked: the villi that are pulled apart in this process are exceedingly delicate. I have been struck with this resemblance on several occasions. I have no doubt, however, that a case might occur, in which, by long neglect, the union should acquire so great a degree of solidity as to yield only to the knife.

When the labia shall have been separated, in these instances of cohesion, they may be carefully kept from coming in contact by a pledget covered with cerate, as the adhesive tendency is renewed by the very violence which is required to obviate the consequences of a preceding irritation.

M. Colombat, in his *Treatise on the Diseases of Females*, advises us to touch one, not both, of the recently separated surfaces, with a nitrate-of-silver pencil, in order to produce on that surface a state of vital action different from that existing on the uncauterized surface; which he supposes must effectually obviate the tendency to cohesion. His idea is, that, to adhere, both surfaces must possess the same adhesive temper. For my part, I have found it, in all instances, sufficient to direct the nurse to draw the point of the little finger, dipped in oil, strongly downwards, from the anterior to the posterior commissure. Such a process, daily repeated, effectually sets aside all possibility of re-establishing the cohesion of the labia.

The Fourchette.—The dermal portion of the labia is partly lost in the perineum, and in part becomes fused or connected with its opposite fellow, and where the inner dermal edges of the two labia unite, there is a sort of edge or frænum, resembling the inner edge of a crescent, the horns of which are turned upwards like a fork, whence the part is termed furcilla, little fork, or, to use a now technical English word taken from the French, the fourchette. Inside of this fourchette, or furcilla, is a sort of depression pit, or cavity, which is concealed until the fourchette is pulled forwards and depressed. This is the fossa navicularis, or boat-shaped pit, behind which, at a greater depth within the orifice, is the front surface of the virginal valve, membrane, or fold, known as the hymen, the mark and sign of chastity and virgin purity, as is supposed by most people.

The Hymen is merely a crescent shaped duplicature of the mucous membrane of the orificium vaginæ which varies much in different individuals. In some women, like a new moon with sharp and curved horns it half surrounds the orifice, being hidden within and only visible when the labia have been separated or pressed open. In some, the horns ascend but a little way, in others they go across the opening above until they almost meet, and in others they do meet, and thus make a circular diaphragm or plane with a hole near its top, or even exactly in its centre. In some girls it constitutes a complete diaphragm without any the least aperture, and I saw one woman i whom the opening was not larger than a common bristle, and whol undiscoverable except while she was menstruating. In that state sh forced the mensual blood through the little orifice where I saw it lik a fine dark point, certainly not bigger than the diameter of a bristl This woman had been several years married. I cut open the diaphragm for her, and so removed the cause of her reproach of barrenness, for after her return to her own distant State she recovered from the operation, and becoming pregnant, had the happiness to be a mother, a thing that all women naturally long to become, or ought to.

It is by no means the rarest of occurrences for girls to be affected with such malformation of the hymen as to be quite shut up, the hymen forming itself into a complete diaphragm like a small tambourine. In this case, nothing wrong is suspected until the age of puberty, when the poor child is observed not to change as usual with girls of her age. The health now begins to fail. Pain in the belly, constipation, and uneasy urination come on, and she grows pale and weakly. Being affected with complete atresia of the orifice, which is shut up by this unnatural hymen, she is all this time swallowing physic, and undergoing a system of dieting, and is treated medically by the process of guessing at her ailments instead of by a method founded upon a physical diagnostication. The existence of this obturating membrane has nothing to do with her power to menstruate, and she does menstruate regularly, but the sanguineous discharge, unable to escape from its prison, accumulates within the now distended walls of the vagina, and when that becomes too much filled to hold any more, the accumulation goes on within the womb's cavity. The uterus enlarges more and more with each successive menstruation, and now from the evident growth of the lower belly, the poor girl is very likely to be suspected of indiscretion. It is a dreadful thing to accuse a sick virgin of the greatest woman's shame, when her pregnancy exists only in the imagination of her ignorant accusers. At length resort is had to the only possible method of diagnosis, and it is found that she labors under atresia from imperforate hymen. The womb will be discovered by placing the hand on the lower belly where its fundus is found rising upwards above the plane of the superior strait; the hymen is found to make a convex tumor at the orifice, and if the index finger is passed upwards along the canal of the rectum, the vagina is discovered to be distended with a mass that fluctuates under the touch. Now that the truth is made known, there is nothing left but to open the hymen by means of a bistoury, taking care before making the incision, to empty the bladder by means of the catheter, and while using the lancet or bistoury to have one finger within the bowel so as to make sure of doing no injury.

As soon as the cavity is opened, the accumulated products of all our antecedent menstruations begins to gush forth in color and consistence resembling molasses or thin currant jelly. If the womb should have been much distended by the collection, that organ immediately tends to contractions, that are felt in the same manner as women's after-pains.

It would be but a prudent precaution, before doing this operation, simple as it is, to announce not only its indispensability, but the no little risk that waits upon it, for it does sometimes happen that the abnormal state of the womb forces it into a state of inflammation subsequently to the operation; and such inflammation may very readily assume the characteristics of mortal metro-peritonitis. I have done this operation for several different persons, and have had cause of serious concern during a few days subsequent to the drawing off of the long retained products, on account of a following inflammatory disposition in the woman.

I ought to add a word concerning the Hymen as a sign of virginity. It is torn in the sexual act, and if the debris of the crescent should be examined soon after the rupture, one might feel no hesitation in speaking as to the facts. Still the question recurs, and we are compelled to say whether or no it is always ruptured if it does exist, and next, whether it does always exist in the virgin. Now, I am entirely convinced that it is not always ruptured in the sexual congress, and I do further know that it may escape destruction even in the acts of parturition, for I have attended in all her confinements (and she has several children) a woman in this city, whose hymen is still perfect, and which never was torn, even in her labors. If this statement is to be relied upon, then it ought to prove that a sexual union may have been perfected in a woman in whom the hymen still remains whole. Further, I have had a very extensive medical practice during many years, in the course of which I have had occasions in numerous instances to examine unmarried women, and the result of my great experience is to convince me that there are thousands of perfectly pure, chaste, and not to be suspected unmarried women in whom no vestige of the hymen is to be found. It seems to me a very singular thing that physicians and others should insist on the necessity of a hymen as a test of virginity, though it is well known that in great numbers of young people the mucous fold or valvule is so thin and delicate that it would be likely to yield if a finger were strongly pressed against it, that in some it is a deep, and in others a low duplicature, in some an eighth of an inch thick, and in other some not thicker than a sheet of paper, and yet with all these differences, the profession everywhere will insist on its permanence, whereas, the truth is that little children of the age of two years are very apt to rupture it in scratching the parts, as most of them are prone to do on account of some irritation there.

If a woman have a hymen whose crescent-edge is at the top of the vagina, and not thicker nor stronger than letter paper, it is clear to see and say that she has never been violated, while in another virgin, whose fold is low, and thick and strong, its persistence affords no proof whatever that she has not been impure; therefore, courts and juries, who sometimes decide on these questions, ought to know that these sayings are true, that they may avoid the risk of committing the greatest injustice by their ignorance and presumption. The question in all such cases ought to be, is the hymen present or absent? is it frail or strong? could it or could it not resist the violence of a coitus? The question is not the naked one as to whether the hymen is or is not in existence in the case.

Finally, vaginal examinations are to be made only under a conviction of their absolute necessity, especially in the cases of unmarried women. Madame de la Marche, in her *Instruction familière et utile aux Sages-femmes pour bien practiquer les Accouchemens, etc.*, p. 5, insists that such examinations should never be made except in consultations, lest the midwife, finding the patient without a hymen, she should be accused of having ruptured the membrane with her hand, and the good lady concludes: "*Enfin* ce seroit un grand malheur, si celle etoit pucelle, de la Toucher."

The Clitoris is a small body composed of two corpora cavernosa and a corpus spongiosum, and is, in many respects, so much like the male organ of generation that it might well be regarded as a miniature production of the same kind. In the male organ the two corpora cavernosa are attached by their crura to the pubis, and receive, in a groove that runs along the middle of their under surface, the corpus spongiosum, which, commencing in the bulb, proceeds to the extremity of the penis where it terminates in the glans penis. In the woman, in like manner, each corpus cavernosum arises from a ramus pubis; and when the two have converged and become united, they rise upwards along the face of the pubis for a short space, and then turn downwards at an acute angle, being buried all the while beneath the mucous membrane investing the parts below the superior commissure. The outer extremity of the conjoined corpora cavernosa is crowned with a glans composed of a true corpus spongiosum, as in the male apparatus. This glans has also a true bulb, or rather two bulbs, which, instead of lying on or near to the cavernous body, are found on each side of the arch of the pubis, below the crown, and covered with the *constrictor cunni* muscle, so that, instead of existing in the form of a bulb of the urethra, as in the other sex, they constitute the two bulbs of the vestibule; the only real difference between them in male and female being their place or location.

In men, when the bulb of the urethra is strongly compressed by its muscles, which contract under the sexual excitement with a sort of tenesmic force, the blood in the vessels of the bulbs is forced forwards along the whole length of the corpus spongiosum urethræ, and compelled to fill up and greatly distend the glans penis, which is only then in a state of perfect erection when the glans has become completely filled with its capillary circulation. This being effected, the sexual excitement attains a high stage, which is supposed to coincide with a certain tension of the nerves contained within the genitalia.

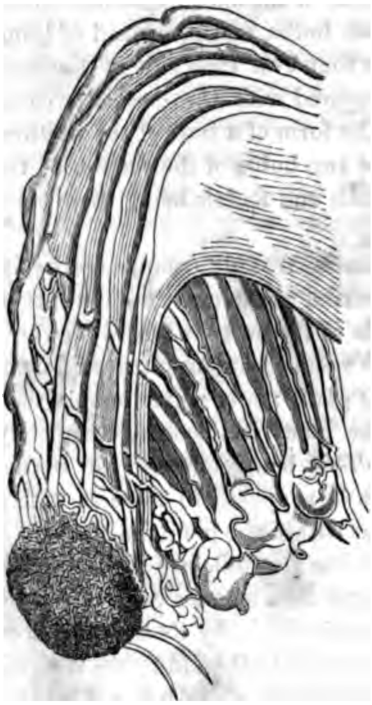
Now, in the gentler sex, the bulbs of the vestibule are the analogues of the bulb of the urethra, and they are in like manner compressed by their proper muscle, the constrictor cunni, which, by its tenesmic contraction, drives the blood forward from these bulbs and forces it along the pars intermedia into the glans of the clitoris, which being filled and intensely distended and excited, arouses the whole erotic force of the subject. The pars intermedia runs upwards under the clitoris, and continues by its numerous channels to force more and more blood into the glans of the clitoris until the nervous tension and orgasm become complete. When this excitation of the external organ has reached its height, the oviducts, commonly called the tubes of Fallopius, participate in the excitement; they become erected, and, as their tissue fills, they are compelled by their attachments, which serve as a sort of mesentery, to adapt their fimbriated extremities to the surfaces of the ovaries; and if perchance an ovum is ready to fall, or is already fallen, it is ingurgitated and swallowed by the tube or oviduct, and so transported into the womb's cavity.

I am indebted for the above account of the clitoris to the admirable work of Dr. Kobelt, which was translated from the German by Dr.

H. Kaula, under the title of *De l'Appareil du Sens Génital des deux Sexes*, &c., 1851.

To make it easy for the Student to comprehend the above account, I here give copies of Dr. Kobelt's figures, and in Fig. 34 I present the magnified drawing of the clitoris, representing that body, however, with the crus removed, so that only the body of the organ with its glans is exhibited. Let the Student compare the glans with that of the male organ, and he will see that the structures are very exactly alike, with the exception that there is no canal of an urethra in the female. In fact, the canal of the urethra is lower down; and yet it is true that when the urine does flow, it jets forth between the two bulbs of the vestibule, which seem to surround the urethral orifice. The great dorsal vein and the artery are marked in the drawing—and the copious convolutions of bloodvessels seen passing upwards from below, and which are called pars intermedia, are channels that convey the blood from the bulbs of the vestibule upwards to conduct it into the capillaries of the glans clitoridis just in the same way as the bloodvessels in the corpus spongiosum lead the blood from the bulb of the male outwards to the glans penis at the extremity of the corpora cavernosa.

Fig. 34.



In Fig. 35 is represented the arch of the pubis and its symphysis, on which is seen the clitoris, bent downwards at an acute angle. Beneath the crown of the arch, and on each crus, is lying a bulb of the vestibule, from each of which, on the right one and the left, is seen mounting upwards the network or plexus of bloodvessels that conduct the blood of the bulbs into the glans of the clitoris. If these bulbs become turgid with blood, and then are subjected to pressure by the constrictor muscle underneath which they lie, the blood is forced by jets through the pars intermedia up into the glans, which being erected, the erotic life is strongly developed on it, and so communicated to the reproductive system.

Fig. 35.

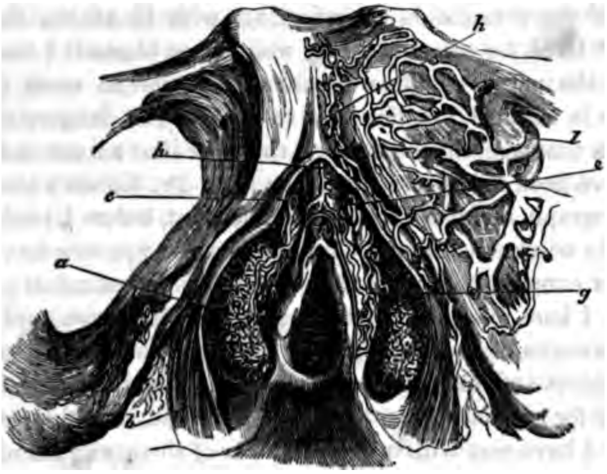
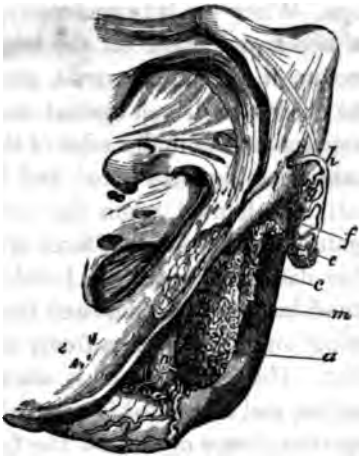


Fig. 36 is a three-quarter view of the same structure. It particularly illustrates the nature, proportions, and place of the right bulbus vestibuli, with its pars intermedia as connected with the glans of the clitoris.

Fig. 36.



Dr. Kobelt remarks, that if one examines these textures in a dead body, they do not seem obvious to the research, and that the orificium vaginæ is surprisingly dilatable; but, if matter of injection be first thrown in, so as to fill all the vessels of the external genitalia, the bulbs become so filled and distended, that it is difficult even to pass the finger through the os externum, so tightly is it embraced by the distended masses of the bulbs. I trust that the illustrations now set before the Student, will assist him to understand all these points sufficiently to give him clear views of the accidents and disorders to which they are liable.

The question might be asked, why I should have placed these illustrations in my book, since such drawings, to say the least, seem fit to make the cheek tingle with shame. I am quite conscious that a book of medical practice ought to be written with a decent regard to decency, a thing very difficult to do even in disquisitions on the disorders of the digestive and the renal organs. In this particular department, I take to myself the consolation of reflecting, with Heurnius, that si non *erubuit* D. O. M. *hos creavisse*, I may well escape blame if I but properly set forth the nature of these tissues with a view to teach the young beginner in medical practice how to obviate the dangers and inconveniences that sometimes attend on their peculiar nature and situation, and I have been led to cite the above from Dr. Kobelt's most admirable monograph, because I never could account, before I read his work, for certain occurrences that I have met with in practice, but which are now clear enough, both as to their nature and treatment. The cases to which I here refer, are hemorrhages proceeding from rupture of the pars intermedia of the bulbs of the vestibule, and these hemorrhages are so violent and alarming, and even so dangerous, that it is quite necessary for a medical man to be well informed as to their nature and source. I have met with a good number of them, and heard of others in the practice of my friends and acquaintances.

CASE.—Mrs. ——, the mother of four children, returned to her home from a ride on horseback. The servant brought a common country chair for her to dismount. The chair terminated in two sharp turned tops. When the lady was ready, she threw herself from the saddle, and as her foot lighted on the edge of the chair, carelessly held by the groom, it turned forwards, and she fell. The sharp turned top of the chair was driven against her riding skirt, and forced her clothing just against the under edge of the arch of the pubis. In a moment she was streaming with blood, and being taken to her apartment, she bled until she fainted, when the hemorrhage was stayed, only to return again with the renewed force of her circulation. Being at a considerable distance from town, I did not see her for some time, and then found her greatly exhausted from loss of blood, and the flowing still going on more or less freely in proportion as she was less or more faint. Her state was truly alarming. I introduced a tampon into the vagina, and distended it as much as I thought fitting, and then applying compresses of lint on the face of the pubis and vulva, I found I had resisting points sufficient to command the outflow, in fact, the method was sufficient, for the hemorrhage was controlled, and the lady recovered. I had a similar case some time ago, in a woman who, sitting on a night-vase, was wounded by a sharp fragment of the vessel which broke under her weight. The hemorrhage was very severe, and likely to prove fatal. Women are sometimes hurt in this way, with sharp-pointed splinters or sticks, when sitting or falling; and I think that these copious bleedings are more commonly derived from laceration of the bulbs, or of the pars intermedia, than from wounding of parts behind the symphysis; for, although there be bloodvessels within, these outside ones are not only the most exposed, but they furnish the most copious outpourings, and these cases require to be understood in order to be well managed. If I should have a case of the kind to treat, I would make a tamponade for the purpose, causing the vulva to bulge more outwards, or to be as convex as possible, and then I would lay upon the ramus of the pubis and on the face of the symphysis, masses or trusses of scraped lint or raw cotton, which I should confine by a closely drawn T bandage. I have no doubt that such a dressing would suffice instantly to control the most desperate hemorrhage from a broken bulb or a lacerated pars intermedia. I shall not detain the Student to speak of other causes that might give rise to severe bleeding, in these tissues, it is enough to have called his attention to the general facts in which he will find not only the indications of his practice, but my apology for introducing in this work a topic so unacceptable.

I refer the curious in such matters to my American 2d edition of *Colombat on Diseases of Females*, pages 84 and 85, where numerous citations may be found. At page 85 is the case reported by me, with a drawing of a very singular disorder of this organ.

Duverney's Glands. In the year 1846, Dr. P. C. Huguier, of Paris, read before the National Acad. of Med., a paper on the diseases of the secretory apparatus of the external genitalia in women. This paper is contained in the 15th vol. *Mem. Roy. Acad. Med.*, 4to., Paris, 1850, and extends from p. 427 to p. 844, with four plates, having numerous drawings.

Dr. Huguier divides the secretory organs of the genitalia into two great classes, *vid.* the sebaceous and piliferous follicles and the muciparous organs. The muciparous organs are of two sorts, some of them being isolated mucous follicles, found here and there about the orifice of the vagina, or agminated, and gathered into patches; and the others massed together and enveloped in a common covering, and all connected with a single excretory duct. These latter compose two glands to which M. H. applies the title of vulvo-vaginal glands. This gland, which, according to the author, was known to Plazzoni, Duverney, Bartholin, Garengeot, Haller, &c., appears to have eluded the attention of modern teachers, and wholly escaped the researches of authors. It is a conglomerate gland, situated just within the vaginal orifice, near the lower end of a nympha about one centimetre above the upper face of the hymen, behind the inner face of the ascending ramus of the ischium. In size it is as large as an apricot kernel. It resembles the lachrymal gland more than any other organ. It may be ovoidal, amygdaloid, reniform, triangular, semilunar in shape, or it may even be a *plaque* of glandules like the glands of Peyer.

The excretory duct of this vulvo-vaginal gland, or Duverney's gland, runs in a direction oblique from below upwards, from behind forwards, and from without inwards. The duct is generally about seven or eight lines, and sometimes eleven or twelve lines long; leaving the outer edge or margin of the gland by several distinct tubes which soon combine into a single duct, and discharges the secretion at the vulva, just behind the hymen or myrtiform caruncle, and never in front of either. A reddish disk or areola surrounds the orifice which cannot be readily found except by pulling the labia outwards and downwards, whereupon one discovers the aperture in the bottom of a small dimple—one on each side of the orifice.

Duverney's gland is the feminine analogue of Cowper's gland in the male, and like other glands is liable to become diseased: when indurated and enlarged it would feel like a hard encysted tumor, which can be extirpated by the surgeon, as the operation has been done by Mr. Huguier.

Like the parotid gland, the gland of Duverney is subject to obstructions of the excretory duct, and the disorder in such case is very like the salivary tumor met with in the stenonian duct. If the excretory tube is an inch in length, and if any cause occurs that closes its outer orifice, atresia of the canal must be the consequence, and the mucous secretion from the gland collecting in the tube causes it to swell or expand and assume at last a globular shape. If examined by the touch, it presents the appearance of a fluctuating abscess or cyst. Such a distended tube must eventually, and indeed soon inflame, and its mucous surface becomes a pyogenic one, so that the tube becomes filled with true pus commingled with juice of the gland. To open this tumor with a lancet seems to be the indication, especially as the surrounding tissues have also become inflamed and very painful; but, this ought not to be done, if it be possible to avoid it, because the discharge of such a sac will not cure the sac which fills again and again, as is so commonly observed to occur by physicians familiar with the disorder.

Taught by the fine memoir of Dr. Huguier, I have adopted his method, and cured the cases by forcing the collected excretions out through the orifice. I cured one in this way in June, 1856, as I have cured others before it.

By passing one finger into the orifice, and then with the thumb applied outside of the labium, one may, with very gentle and slowly augmented pressure, compel the collected fluid to advance along the obstructed canal to its orifice, whence the whole of the pus and mucus spouts out in a jet or stream until the sac is completely collapsed and emptied. On doing this, the pain is removed, except the excessive distension may have caused a sort of phlegmonous hardness and painfulness to affect the texture of the labium, and even that soon disappears after the cause is properly removed, as above. My advice, then, to the Student is to suspect Duverney's gland or its excretory duct in all those cases in which he shall be complained to of great pain, soreness, hardness, and swelling of the labium. No one need question that common abscess may exist in a labium, and require to be healed as such, but the fact is that most of the complaints of this kind that occur in practice should be suspected as somehow concerned with Duverney's gland.

OF THE VAGINA.

Having now given some account of the external organs of generation, I have to speak of the vagina, which, as it is, according to the French terminology, a vulvo-uterine canal, is partly an external and partly an internal organ of generation.

Previously, however, to passing on to the study of the inward structures, I wish to recall attention to the admirable wood-cut by Baxter (Fig. 18), which is reduced one-half from Kolrausch's plate. I much regretted the necessity of making this reduction, which was not to be avoided, on account of the size of my page.

I cannot think that the modern literature of obstetrics anywhere contains a more admirable and instructive anatomical drawing than the one from which I have taken this reduced copy. It is from the *Zur Anatomie und Physiologie der Beckenorgane*, by D. O. Kolrausch, Leipzig, 1855, 4to., pp. 64. This drawing is from a preparation of the parts of a maiden who, at the age of 24 years, committed suicide by hanging while menstruating. The subject having been dissected, and the specimen reduced to the form seen in the figure, it was placed in a vessel containing alcohol, through which every part of the surface to be examined could be clearly seen, as in our picture. When thus carefully placed in the transparent alcohol, a glass plate was laid over the vase as a cover, through which every line, fibre, or form could be seen. About two feet high, above the middle of the preparation, was secured a diopter, through which the artist was to look when copying the specimen. A pen dipped in printers' ink softened with oil of turpentine, was used by the artist, who, looking through his diopter, two feet above the preparation, could see through, and draw or copy upon the glass with his pen, every one of these different lines and points, which being finished, the drawing was transferred from the glass to paper, and then engraved. Such is Dr. Kolrausch's history of this beautiful plate, which is of inestimable value to the student of midwifery, as imparting to him an absolute correct ideal of the relative magnitudes, forms, and places of the parts within the pelvis.

A line drawn from the promontory of the sacrum to the top of the pubis represents the place of the plane of the strait, which shuts down beneath it all the pelvic viscera, except that the bladder, when filled with urine to the degree represented, does jut upwards into the belly, as is known to be the case. It may even be distended, so as to rise as high as the navel. I shall have frequently occasion to refer to this plate, as I now do in proceeding to speak of the vagina.

The **Vagina** is a mucous tube that serves as the excretory duct of the uterus. Not only the menstrual products but the mucus and the other fluids separated from the uterus find their exit through this canal, which is formed on a plan that admits of an expansion sufficiently great to give passage to the fœtus at term. Being liable to most enormous changes of dimensions, the vagina could not be composed of fibrous tissue, but, as I above said, it is a mucous canal or tube, whose basement texture is a laminated areolar tissue, containing numerous glandules and follicles which yield a sort of slimy liquor that lubricates the whole. Numerous bloodvessels, absorbents and nerves, together with a few muscular fibres scantily dispersed, impart to it its peculiar life qualifications, which appear to me to be passive rather than active, having but little influence upon the general economy, a circumstance in which it greatly differs from the uterus, and some other portions of the reproductive system, very slight affections of which are known to develop the most considerable disturbance of the animal economy, whereas even grave disorders of the vagina do not seem to awaken a decided constitutional irritation.

The lower or outer extremity of the vagina, its *introitus*, is surrounded with a sphinctorian muscle that enjoys a community of life and activity with the sphincter of the rectum, and might be considered as a sort of appendix to or prolongation of the great sphinctorial muscle: by its contractions it keeps the ostium of the vagina strictly closed.

In women who have not had children, the anterior and posterior walls of the vagina generally rest in contact. Hence the transverse diameter of the tube is much greater than its antero-posterior diameter. This contact of surfaces, however, does not exist in emaciated women, or in those who have very little stercoraceous matter left in the rectum. I believe that in most women who have what is called a scaphoid abdomen, the walls of the vagina become orbicular, or balloon-shaped. In these cases while the ostium is tightly closed, a man's fist might lie inside of the canal without touching the walls. I have found the vagina balloon-shaped, in this way, in many different women, both young and old.

The above remark is worthy of the student's consideration, inasmuch as it sets forth the important truth that the upper or uterine extremity of the vagina is excessively yielding or distensible, while the vulvar extremity of it is firmer and more resisting. The clinical application of the doctrine is found in the use of the tampon. Many doctors seem to me to think they have made a tamponade if they but insert a sponge as big as an egg into the vagina, a thing they would not do if they but knew how distensible is the uterine portion of it. To insert such a sponge into the vagina that shall readily assume the shape of a balloon as large as a child's head, is simply a foolish thing; a tampon should be large enough to fill the balloon.

The vagina is two inches and a half long; in the general, it ought to be about three inches long, but not one woman in a thousand has it so long, and not one in ten thousand of those who are mothers.

I was much surprised to find that Dr. Tyler Smith, in his "Course of Lectures on the Theory and Practice of Obstetrics," *Lancet*, No. 2, vol. i. p. 30, 1856, should think that the "anterior wall of the vagina is about four inches long, the posterior being five or six inches in length." That author must have allowed his pen to slide in making such a statement, for the distance from the crown of the arch to the lower end of the fourth segment of the sacrum is but little more than four inches, even in the dried pelvis. Therefore the author has made a mistake, for there is not room enough in the cavity for so long a vagina, and a womb of two and three-quarter inches. Such a womb would lift its fundus more than four inches above the plane of the strait, which it never does when it is in the normal state, and in pregnancy not until the fifth month.

The authors speak of the anterior and the posterior column of the vagina, and there is some reason to say so, because the substance of the tube is thicker and firmer in front and behind than on the right and the left sides. This greater thickness is in part due to the corrugated state of the mucous membrane in those precise localities, yet not wholly so, since the columns are observable even in multiparas who have long ago lost all their rugæ or corrugations. The anterior column is thicker than the posterior one. They both grow slender as they ascend, and at the points where the vagina unites with the neck of the womb, the appearance of a column is lost.

I like these words, anterior columna, and posterior columna, because I like to suppose that when the anterior columna becomes shorter than it ought to be, the womb to which it is fastened by one end, while the other end is anchored to the arch of the pubis, must be drawn down toward the pubis, and kept there by the contracted or condensed columna, which holds or ties it there. In some instances this anterior columna becomes so short, or so condensed, that it can only with difficulty be extended again by pushing the womb away from the pubis with the finger; and even when one succeeds in so pushing it away, it is brought back again immediately by the elastic contraction of the condensed vaginal column, so that it renders a permanent cure of the displacement or derivation of the womb a very difficult thing to effect. I have seen it not half an inch long.

Kolrausch's plate, Fig. 18, which is, in my opinion, perfectly dependable, shows the anterior columna to be only one inch and three-quarters long, and the posterior columna only two inches and six-tenths in length instead of five or six inches. I have certainly examined many thousands of women of all ages and in various conditions, and my sense of the case is, that a vagina whose anterior column is two inches and a half long, is long enough, for it lets the os tincæ take its true place in the pelvis.

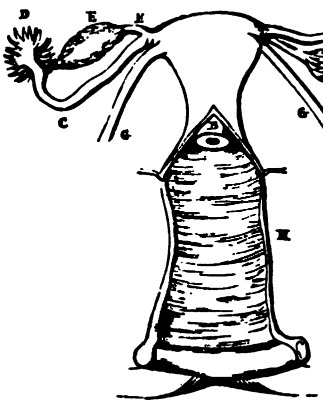
It is quite necessary for the Student to know not only the anterior column, but also the two ligaments that are called utero-sacral ligaments, which are nothing more than duplicatures of the peritoneum in every respect similar to the ligamenta lata. They go in a direction backwards and upwards from the uterine extremity of the vagina to the sacrum, into the anterior aspect of which they are inserted, and their office is to hold the end of the vagina up in its proper place. Look at Kolrausch's picture, and conceive of a band or cord proceeding from the posterior lateral surface of the vagina to the second segment of the sacrum. If such a string should be strong and taught, the vagina must keep its place, but if the string were cut, the vagina would drop down, and carry the womb along with it. The same effect would follow upon a relaxation of the band—the vagina must slide down, carrying its womb along in its fall. Is not falling of the womb, then, the same thing as relaxation of the vagina? What else could it be? It could not be, and it is not anything else.

I have written so fully upon this subject in my *Letters on Woman, her Diseases and Remedies*, and in my *Essay on the Acute and Chronic Diseases of the Neck of the Womb*, that I must refer the student to those works for my further views of the disorders of the vagina.

It is proper, however, for me, in this place, to say that as the vagina is the excretory duct of the womb, it is so constituted as to undergo very great changes of its capacity in parturition. The tube may be considered as a cylinder in the non-gravid state, but when the womb is enlarged by the growing ovum, and particularly near the close of a pregnancy, the cervix uteri becomes a cone, and, of course, the upper end of the vagina, which invaginates that cone, must also assume a conoidal form. But when labor is advanced, and the os dilated, the upper end of the vagina must dilate *pari passû*. It is not every specimen of the vagina that is so distensible as I have represented it generally to be; and when it is really a resisting body, it yields reluctantly to the force of the throes and ofttimes causes the process to be slow and very painful, so that among the numerous causes of slow and protracted labors, we must occasionally find this tube at the bottom of the mischief. It becomes rigid in this way in certain women who have suffered from chronic vaginitis, the effect of which is to give a tendency to a sort of general stricture or narrowing of the whole canal. I have often met with instances in which the organ, even in married women, presented obstruction to the passage of a Recamier speculum up to the os uteri. It is manifest, then, that such a state of the tissues might interfere with the normal developments in a labor. I have published some cases of this stenosis of the vagina in my work on female diseases, and in my treatise on diseases of the cervix. A very good account of such affections is to be found in the work of Spaeth, Chiari, and Braun, already cited, as well as in my *Translation of Colombat de l'Isere's Treatise on the Diseases and Special Hygiene of Females.* M. Colombat's article is at p. 96, and at 97 is a lengthy account of cases observed and reported by myself.

The Womb.—The uterus is attached to the upper end of the vagina. It is a pear-shaped body, compressed from front to rear, and of various length, which may be from two and a quarter to two and a half inches, rarely three inches—being larger in women who have borne children than in those who have never been impregnated. It is divided into fundus, body, and neck; the fundus being the uppermost, and the neck the lowermost part of the organ. The vagina is united to the womb in such a way as to permit its neck to project like a nipple a short distance into that tube: in this regard also there is great variety, some women having almost half an inch of the cervix uteri hanging down in the vagina, while in others the connection seems to exist almost at the lower end of the cervix. (See the engraving.)

Fig. 37.

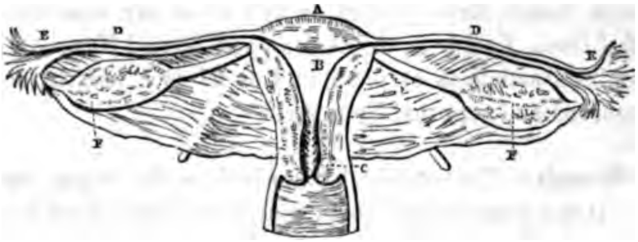


The cut (Fig. 37) represents the womb B, with the vagina H, laid open, in order to show the neck and mouth of the womb B projecting into the upper end of the vagina. In it are also seen the round ligaments G G; the ovaries E E; the ligament of the right ovary F, and the Fallopian tubes C C, with their fimbriated extremities D.

As the vagina is a curved canal, which proceeds backwards from the vulva, and upwards towards the rectum, it follows that the womb lies nearer to the sacrum than to the pubis. The womb is so situated that its long diameter is parallel to the axis of the superior strait, while the vagina is more nearly parallel to that of the inferior strait; hence, at their junction, they make an obtuse angle of nearly 95°, any deviation from which implies a displacement of the womb.

Let the Student say the breadth of a womb is about an inch and a half; its thickness about one inch; its length two inches and a quarter: this is the mean. I subjoin a drawing that represents the internal organs divided transversely from top to bottom, and showing the front or anterior half. A is the fundus or bottom of the womb, which is the uppermost or highest portion of the organ. B is the triangular cavity

Fig. 38.



whose outlet is through the canal of the cervix (O), leading down to the orifice of the womb in the vagina, which orifice is called os tincæ, or os uteri. At D D are seen the left and right Fallopian tubes laid open, to expose the narrow passage by which the ova are conducted from the ovaria F F. E E are the fimbriated extremities of the tubes, which are also called morsus Diaboli, or Devil's bit: they are the infundibula or ingluvies which take up the ova as they spontaneously escape from the ovisacs of the ovaries when expelled once a month. The wing-like expansion on each side of the womb is the broad ligament, and the round ligament is seen through it and in front of it on either side of the uterus.

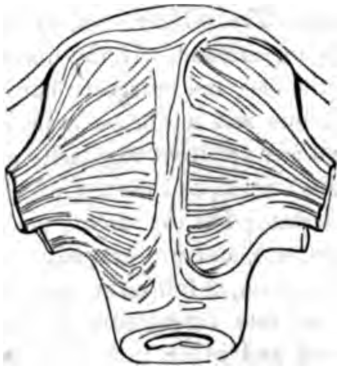
Suppose half an inch of the cervix uteri to project into the upper part of the vagina; then if the whole length be two inches and a quarter, we shall have one and three-quarter inches of the womb above the upper end of that canal. Such being the case, the womb would fall over to the right or left side of the pelvis, were it not restrained or stayed by what are called its broad ligaments, which, passing from its sides towards the sides of the pelvis, keep it steady, or prevent it from assuming an oblique attitude; it would also fall backwards towards the sacrum, and sometimes become lodged or wedged under the promontory of that bone, were it not restrained from moving in that direction both by its round ligaments, called by Fallopius its cremasters, and also by its connections with the bladder. The utero-sacral ligaments, which form the lateral walls of Douglas's cul-de-sac, also maintain the uterus *in sitû*. It cannot fall forwards, for it is sustained by the bas-fond of the bladder, which, by filling with urine, must, and does always push it backwards again.

Structure and Powers of the Womb.—The substance of which the womb is composed has not been fully understood. In the unimpregnated state, it is dense and gristly to the feel, and cuts very hard; the cut surface being of a faint pinkish hue and a fibrous appearance; but those fibres are disposed without any apparent regularity or order. It is supplied with bloodvessels, absorbents, and nerves, which are very small during the unimpregnated state; but the same vessels in the gravid womb acquire an enormous size, and are exceedingly numerous and tortuous; so that, in fact, the ovum, at full term, appears to be contained within a vast network, or rete vasculosum, united together by a quantity of muscular fibres and other tissues. The womb, at the full term, is an exceedingly sanguine organ, being furnished with torrents of blood from the uterine and spermatic arteries, the former reaching it from below, and the latter from above, with free inosculation of the several channels of circulation.

As to the interior membrane, or mucous coat of the womb, it is unnecessary to speak here: the cut, exhibiting Mr. Coste's view, will explain the matter with sufficient clearness.

Various attempts have been made to demonstrate the muscular fibres of the womb, and they have been divided into layers, and planes, and fasciculi for that purpose: but the very fact of such difference of opinion is proof enough that the arrangement of them is not yet clearly known. If it were known and demonstrable, there would no longer exist any dissidence concerning it, since whatever is clearly demonstrable, ceases to be a subject of dispute or doubt. This much, at least, is well known; namely, that the contractile fibres of the womb are capable of acting partially, or so as to change the form of one part of the organ, while another part of it acts with less intensity, or not at all. Thus, it occasionally happens that we find the uterus, after delivery, contracted in its middle, as if a string had been passed round it and drawn tightly, causing it to assume the shape of the hour-glass. This state is familiarly denominated an hour-glass contraction. Again, we not unfrequently find the whole organ elongated, and almost of a farciminal form; its fundus being raised high upwards, towards the epigastrium, while the body of it is narrow or slender like an intestine. I feel assured that I have sometimes found it, after delivery, full nine or ten inches in length, and not more than four inches in transverse diameter, estimated by feeling it through the relaxed integuments of the abdomen. These circumstances prove that the uterine fibres which affect the conjugate diameter of the organ may act with force, while those which affect its longitudinal diameter are either in a state of repose, or of very slight action; which leads us, as I think, to the inference, that the longitudinal and horizontal fibres are separate and independent organs or parts of the uterine structure. The annexed cut (Fig. 39), from M. Chailly's *Midwifery*, gives a view of an arrangement of muscular fibres which seem to converge upon the tubes and round ligaments. Let the Student conceive of a separate, non-coördinate action in these fascicles of muscles, and he will perceive that such action might greatly embarrass a labor in

Fig. 39.



which the contraction ought to be consentaneous and co-ordinate for the whole muscular apparatus of the organ.

If this be a just view of the case, it will serve for the explanation of occurrences in labor that would otherwise embarrass us not a little. For example, we find the woman in travail sometimes suffering under the most intense pains, and making the greatest efforts without the smallest profit; and that, too, where we know certainly that the pelvis is of the amplest dimensions. What can be the cause that the child does not advance under such vigorous efforts? We find that the head is positively stationary, notwithstanding the healthiest pelvic conformation, a sufficient dilatation of the uterus, and violent labor pains. We are at once satisfied, and relieved of anxious doubts, when we reflect that the horizontal or transverse fibres are active, and the longitudinal or perpendicular fibres inert. There is a failure of co-ordination in the movements, and our duty will be clearly seen to consist in endeavors to restore the synergy of contractile effort.

As this circumstance generally results from some excess of a local or constitutional irritation, the former occasioned by tedious or violent labor, rheumatism, officious intermeddling, or the direct stimulation of ergotism; and the latter by a too susceptible nervous system, repletion, mental emotions, or vain efforts of labor long continued: it appears that, in the former case, we ought to resort to the tranquillizing influences of laudanum clysters, cool air and drinks, and abstinence from impertinent handlings; whereas, in the latter, we may apply to the lancet, to a Dover's powder, to portions of morphia, or the black drop or opium, or the bath—after evacuations have been procured from the bowels by emollient and laxative injections; and that we ought to give orders for a full and free ventilation, and the use of suitable drinks.

But if it does sometimes happen that the movement of the horizontal fibres is inordinate, or in excess, it fortunately happens in the vast majority of cases that the powers of the longitudinal fibres are the greatest. The ovum being contained entirely within the uterus, it appears that it can only be expelled by the fundus approaching the os uteri; or, in other words, by the shortening of the womb that results from the contraction of its longitudinal fibres. Let us remember that the womb is attached to the upper end of the vagina, and that the ovum, in passing out from the uterus, must necessarily traverse that canal. It will then appear that the first contraction of the longitudinal fibres will tend to pull the circle of the os uteri open at the same time that the point of the ovum is insinuated into the enlarging orifice. This opening or dilatation of the orifice does not take place without resistance, which is chiefly perceptible, however, in the early stages;

for we find that while the fundus and body of the womb are vigorously condensed during a pain, the cervix also is strongly contracted, but less and less vigorously as the dilatation becomes more considerable; so that, indeed, it is not rare, at length, to perceive the whole circle of the cervix suddenly yield, as if without opposition, to the greater power of the longitudinal fibres. The circle of the os uteri is, as it were, pulled upwards, towards the fundus uteri, by the muscular expulsive powers; and indeed it seems to be stripped over the lower segment of the ovum, over the head, or over whatsoever presenting part. I have known the whole dilatation to take place during a natural sleep.

Some women require only a few pains to complete the dilatation, whereas others suffer hundreds of pains during several successive days, before the circular fibres are conquered by the protracted efforts of their antagonists, the expulsive ones.

From thirty-five to fifty are probably the average number of pains felt by parturient women. If four hours be a mean of the duration of labor, then the woman will be likely to have pains at the rate of one every ten minutes for the first hour—which would be six pains. She would probably have ten pains in the second hour, fifteen in the third hour, and twenty pains in the fourth and last hour of the process—say, in all, about fifty pains.

While the generality of cases are so favorable, there are multitudes of women who have not more than three or four; whereas some of them suffer from the repetition of two hundred contractions, and even a greater number than that.

A considerable experience and trained habits of observation are necessary to enable a practitioner to prognosticate the moment of delivery, making up his judgment from the intensity of the pains of expulsion, as compared with those of opposition or retention. It is certain that no man, be his experience ever so great or his discrimination ever so acute, can with absolute certainty calculate upon the moment when any given labor shall be brought to a conclusion, since no one can absolutely predict what shall be the exact degree or intensity of any muscular effort, which, as it is a vital operation, so it is dependent on causes beyond our foreknowledge or perfect control. Young and inexperienced practitioners ought, therefore, to be very late in announcing their prognostic of the end of labor, as to time.

I have remarked that, as the longitudinal fibres pull the os uteri open, the apex of the ovum is inserted into the aperture: with each succeeding pain additional portions of the ovum pass into the os uteri and through it, until, at last, the fundus having approached very near the cervix, the whole of the ovum becomes excluded from the uterine cavity, after which the same longitudinal and horizontal fibres, meeting with no further considerable resistance, act in concert, and thereby reduce the womb down to a very small size. It returns, but slowly, to the non-gravid condition. From fifteen to thirty days are required to effect this reduction. Let it be remembered that the womb is capable of contracting equally upon an ovum at term, and upon an abortion at three weeks.

The planes of the ischia are three and a half inches long. The womb is two and a quarter inches in length: when it occupies its proper place in the pelvis, the top of it is not so high as the top of the ischium; in other words, it is lower than the plane of the strait; but the point or os uteri sinks low down towards the bottom of the pelvis. The womb does not occupy the same place in the pelvis when the bladder is full that it does when that organ is empty; but retreats when the bladder is filling, and comes forward when it becomes empty again; hence the organ is scarcely ever at rest in the same place.

This movableness, and constant change of place, often result in the injury or weakening of its ligaments, particularly its round ligaments, which in some women become so much stretched by an over-fulness of the urinary bladder, that they fail to contract, and so, let the fundus uteri fall downwards into the hollow of the sacrum, until the womb is quite overset, backwards. This makes a case of retroversion of the womb.

When the womb is retroverted, and continues so for months or years, the os remains all the time close to the symphysis pubis; and at last the anterior column of the vagina condenses itself so as to accommodate its length to the actual short distance from the cervix to the symphysis.

If it be reposited, and an attempt be made by means of a common pessary to restrain it from falling over again, the attempt frequently fails and the instrument falls into discredit. The cause of the failure is in fact in the contracted, condensed, elastic anterior column of the vagina, which slowly, but surely, pulls the cervix over the top of the pessary, to bring the os back again close to the symphysis; and then the anterior column having come to a state of rest, as to its contractility, there is room enough to allow the fundus to sink again into the recto-vaginal pouch, or Douglass's *cul-de-sac.*

In old cases, therefore, the ordinary pessary will not answer; but they are always curable by means of a ring pessary, of proper construction; for, when the posterior segment of such a ring is lodged in the posterior *cul de-sac* of the vagina, and the anterior segment behind the symphysis, it is clear the os cannot come forwards again, nor the fundus fall down behind.

CHAPTER V.

THE OVARIES.

THE ovaries are organs for the preparation of ova, or eggs which contain the germ of the offspring.

In the mammals, there are two ovaries, within each of which may be seen, with a good lens, from twelve to fifteen eggs, or yelks, inclosed within their proper capsules or ovisacs, which are commonly called Graafian follicles, or ovarian follicles. They were some time since denominated Graafian ova—because De Graaf imagined that these pellucid bullæ were the ova of the animals in which they were seen by him. Let the Student early make the discrimination between the follicle, the cell, or ovisac which contains the egg, and the minute egg itself, which is too small to be readily seen by the naked eye.

The human ovary is about an inch in length, half an inch in depth, and more than a quarter of an inch thick; in shape, it is like a flattened olive.

Each ovary is attached to an angle of the womb—one on the right, and the other on the left. It is connected with the uterus by a short footstalk of a fibrous structure, which is called the ligament of the ovary.

The ovaries lie behind the Fallopian tubes, inclosed in a duplicature of the peritoneum, that adheres firmly to the proper covering or coat of the organ; so that the ovary is invested by a serous membrane or indusium, as the liver, stomach, or intestines are.

Underneath the serous covering lies the strong white fibrous coat, or tunica albuginea, which is a closed sac containing the stroma, the peculiar tissue of the organ. There is thus no proper excretory duct for this organ; nevertheless, the Fallopian tube becomes, upon occasions, the vector of its product. The connection of the vector tube with the organ exists, in all probability, only during the few moments of the sexual excitement, or orgasm. In the embryo, however, as late as the sixth month, the end of the Fallopian tube is permanently attached to the ovarium—before the seventh month, the connection is broken. (See Rosenmuller, *Quædam de Ovariis Embryonum et Fœtuum Humanorum*, p. 11.)

I have a specimen of fœtus at the sixth month, in which the detachment has not taken place.

The stroma of the ovary, with which the closed sac of the albuginea is filled, is a peculiar concrete, consisting, apparently, of a rather dense cellular tela, of a salmon color. Throughout the stroma are to be seen numerous delicate arterioles and venules, that are the distal branches of the ovaric artery. It is worthy of observation, that the blood of this circulation is brought from a great distance, since the ovaric artery arises for one side from the emulgent, and for the other from the aorta itself. As the ovaries, like the testicles in the male, are originally formed high up in the abdomen, near the kidneys, an economical purpose was answered by deriving their circulation from these sources. Whether there be any further and peculiar economical end to be attained by drawing this blood from such a distant point, remains unexplained.

If the tunica albuginea of an ovary be divided with a scalpel, the stroma may then be readily torn asunder by pulling the edges of the incision apart with the fingers.

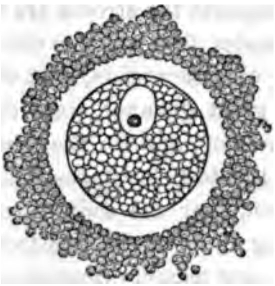
The ovary of a mammal, when examined for the purpose, exhibits several watery vesicles, whose translucency renders them visible through the indusia or coats of the organ. By cutting the ovary open, and carefully dissecting them out, these vesicles or bullæ may be completely freed from all attachment, when they appear as globules filled with water, and of sizes varying from the bigness of a garden pea to that of a small bird-shot. In each ovary may be counted some fifteen of these vesicles.

These Graafian vesicles—for so they are usually denominated—are also called Graafian follicles, Graafian cells, Graafian ova, and ovarian follicles. They are ovisacs. They are composed of a double membrane, one inside of the other. The outer or largest one, is united to the smaller or inner one, by a very delicate cellular bond, or magma, which, if infiltrated, serves to compress and crush the inner, while it distends and expands the outer coat or sac. Hence, if the outer sac should thus be greatly enlarged, the inner one would at the same time be crimped or corrugated, so as to give to the inner surface a convoluted appearance.

If a Graafian vesicle be punctured with a lancet, there spirts out, through the cut, a drop of water. This drop of water, when collected on a glass or knife-blade, and placed under the microscope, is found to consist of a pellucid liquor, in which swim a great number of small grains. Among these grains there is a portion or acervulus, in which the grains are agglomerated in greater number, and, in the midst of these, a yelk-ball is found.

Fig. 40 represents this yelk-ball, bounded by a white, transparent zone, which is called its zona pellucida. It is a perfect sphere, filled with vitellary corpuscles, oil globules, and puncta that swim in a transparent liquor. The sphere or yelk-ball lies amidst the cumulus of granules before mentioned, as may be seen in the figure, taken from Rudolph Wagner's *Prodromus.*

Fig. 40.



It is outside of, or beyond the white zone or zona pellucida, that are to be seen the smaller granules of the cumulus or acervulus, so that the globular ovum above represented is bounded by the transparent or white zone. These outside granules are some remains of the granular membrane that lines the inner concentric membrane of the Graafian follicle.

Perhaps the physiologists go too far in calling it a granular membrane. It consists of innumerable grains that settle themselves, touching each other, upon the inner wall of the vesicle, like sediment in a vial. I do not deny that they deposit themselves thus under the forces of a vital affinity, and it is even probable that they do so; but whenever the vesicle is punctured, this so-called membrane becomes decomposed, and floats out as loose grains along with the yelk-ball; great multitudes of them adhering to it; many being entirely disconnected, while some of them stick together in laminæ, or clusters, or acervuli.

This granular membrane, or tunica granulosa, is thickest, in general, at that segment of the Graafian vesicle which is nearest the surface of the albuginea, and there it forms a small heap—an acervulus or cumulus, which has been by Baer called the cumulus proligerus or discus proligerus. It is in the apex of this cumulus or cone that the egg is found, and it is generally among the debris of this acervulus that the microscope reveals the yelk, with its bright pellucid zone.

Upon referring again to the above figure, the Student will see that in the yelk-ball, amidst its vitellary corpuscles, there is pictured a clear, transparent, oval vesicle, with a dark spot upon it. This is the germinal vesicle, sometimes called Purkinjean vesicle, and the dark spot is the germinal spot, or maculæ germinativæ of Rudolph Wagner, which M. Coste calls the *tache embryonaire.*

Such, in general terms, is the human ovary, which, I repeat, consists of a closed sac, filled with ovarian stroma, in which are developed ova within ovisacs usually called Graafian follicles. These ova are true yelks, about one-fifteenth of a line in diameter. In each unfecundated yelk is a germinal vesicle one-sixtieth of a Paris line in diameter, and having upon its inner surface a germinal spot consisting of dark granules—the germinal spot being one-two-hundredth or one-three-hundredth of a line in diameter.

I have many times observed the numerous granules, or dark puncta, that may be inspected by placing thin slices of ovary on the field of a microscope. There are immense numbers of these points, which are, by some, supposed to be nuclei, or cytoblasts—the inchoate elements of ovarian ova. Such is the opinion of Martin Barry, who gives, in his papers, published in the *London Phil. Trans.*, drawings of these appearances in the ova of various animals. Gerber's anatomy also contains a plate representing this microscopic view.

If this notion be indeed founded in truth, then each ovary should be held to contain, not fifteen ova only, but the nuclei of hundreds of thousands of them.

Perhaps, however, the microscopic view is not correct, and these points are acini of the gland, if the ovary is a gland. Supposing them to be acini, and that an acinus may, by some physiological act, be cast off from its connection with the stroma that produced it, and carry away with it, like an inoculated bud or like a spore, or a pollen grain, the metabolic and the plastic forces—by which to develop the ovarian ovule—still we have, in either case, the idea of a reproductiveness in creatures beyond imagination for copiousness.

The ovaries are abundantly supplied with nerves derived (*Longet*, t. ii. 543) from three or four branches that come off from the renal plexus, and proceed, in company with the ovaric artery, to the place of distribution. They are called the ovaric plexus, and distribute their terminal fibrils within the ovary, and in part, also, upon the uterus, thus connecting the two organs in a common bond of sympathies.

Regner de Graaf, of Delft, in Holland, where he died at the age of thirty-two years, on the 17th of August, 1673, published his work *De Mulierum Organis Generationi Inservientibus* in 1672, and gave, as I have said, his name to the ovarian vesicles, or ovi-capsules. They were by him considered to be ova, and were long, and even until lately, by many, regarded as ova; for no one, until recently, had acquired any correct notions of the ovum of the mammifera.

At p. 181, he says: "In cuniculis autem, leporibus, canibus, porcis, ovibus, vaccis et reliquis animalibus à nobis dissectis, ea vesicularum ad instar, ut in avibus ovorum germina solent, sese dissecantium oculis exhibent; quæ in Testiculorum superficie existentia, communem tunicam hinc inde sublevant, atque ita per eam aliquando transparent ac si brevi exitum minarentur." His 15th plate represents the follicles as "ova." They are not ova, but merely ovisacs.

It is a title to immortality in the Republic of Letters, to have discovered the ovum of the mammal, and there has been a great contention as to the priority in this claim. It appears to me that, although one person may have first seen the object, so many individuals have been concerned in establishing and explaining the natural history and physiology of the fact, by laborious researches and patient efforts of reason, that no single person should be deemed entitled to all the credit: and it is certain, that the world is too much indebted to divers persons on this account, not to be willing to divide the honors of the career among many claimants. I feel no inclination to enter in favor of any particular person the lists of this controversy, in which I have no other than a common interest of gratitude to all the ingenious philosophers who have in this illumined my therapeutical path with floods of radiant light, freeing me from the errors and gropings of my blind predecessors, and enabling me clearly to perceive, and plainly understand many mysteries of physiology and therapeutics that were utterly hid from their eyes.

But the Student of medicine ought to be somewhat acquainted with the literary history of the subject, lest he wander, and be wholly lost among authorities that have now ceased to have any claim to his obedience. Let him, therefore, understand that a meeting was held at Breslau, in Silesia, in the year 1825, in honor of the fiftieth year of the Doctorate of Professor Blumenbach. At that meeting was presented a volume under the following title: *Joan. Fried. Blumenbachio, etc. Summorum in Medicina honorum semisæcularia gratulatur ordo medicorum Vratislaventium, interprete Joanne Ev. Purkinje. P. P. O. Subjectæ sunt symbolæ ad ovi avium historiam ante incubationem: cum doubus lithographis. Vratislaviæ, Typis Universitatis.* This volume was printed in September, 1825, but was not published, being designed only for private distribution. An edition of it was afterwards published for sale at Leipsic, in 1830, 4to., of which a copy is now before me. I look upon Professor Purkinje's book as the first in the series of the works of reform as to our knowledge of the ovaria. This is the work in which was first made known the existence of the germinal vesicle, commonly called the Purkinjean vesicle of the bird's egg.

Professor Purkinje had interested himself in the investigation of the cicatricula, or tread of the hen's egg. He was examining it in a vessel of water in order to learn the nature of the cumulus that lies directly underneath the cicatricula, and of which Fig. 41 is a representation. It has been very beautifully produced on wood by Mr. Gibon, from the original lithograph.

Fig. 41.

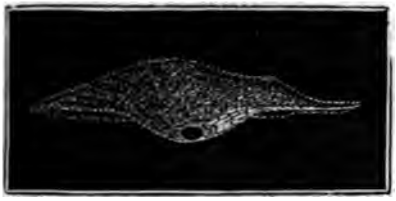
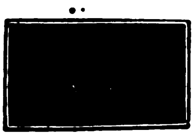


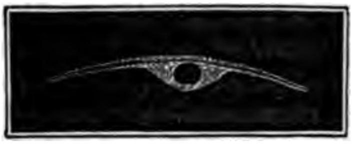
Fig. 42.



While, with a pair of dissecting needles, tearing the yelk asunder under water, and removing the broken-down masses with a pipette, he came upon a "most beautiful vesicle," partly adhering to the margin of the pore in the apex of the cumulus, and partly detached from its bed therein. His own words are: "Hæc dum lente ope perlustro, vesicula formosissima parte margini pori adhærens, parte libera haud parum mirabundo mihi offertur." Fig. 42 exhibits this appearance.

The cavity in which this Purkinjean, or germinal vesicle (the first that was ever seen), is contained, is represented by Purkinje as in the annexed cut, Fig. 43, also copied from his lithograph. It is a cross section of a portion of the yelk-ball and the cumulus, with its cavity, in the hollow of which was found the Purkinjean vesicle. The transparent vesicle thus revealed is almost as delicate in its structure as a soap bubble. It can be found only in eggs that have not been fecundated, such as the pullet's egg, or yelks taken out of the ovary, in which, according to Von Baer, it exists, even in the very smallest yelks. Fecundation abolishes it.

Fig. 43.



The Student has now a clear understanding as to the germinal or Purkinjean vesicle, discovered and made known in September, 1825. This Purkinjean vesicle is the germinal vesicle that is found inside of the unfecundated yelk, whether of birds or women or other animals.

The next publication in the order of important discovery, was the *De ovi Mammalium et Hominis Genesi. Epistolam ad Academiam Imperialem scientiarum Petropolitanam, dedit Carolus Ernestus A. Baer. Zoologiæ Prof. Publ. ord. Regiomontanus, cum Tabula Aenea.* Lips. 1827, 4to.

Such is the title of Von Baer's letter to the Imperial Academy of Sciences at St. Petersburg, on the subject of the ovum of the mammiferous quadrupeds.

In Von Baer's experiments, he, like Purkinje, never could find the vesicle in eggs already laid, but always detected it in even the smallest yelks of the egg bag. He supposes it to be the nucleus around which the matter of the yelk becomes subsequently aggregated. This was the case also in the molluscs, in the lumbricus and in the leech. These researches led him to the discovery of the mammiferous ovulum, in the following manner.

Having observed a very minute ovulum in the Fallopian tube of the bitch, and reflecting that such *small* ova could not consist of Graafian vesicles, which are much larger, and that the liquor of the Graafian vesicle could not so soon acquire the firmness and solidity of the tubal specimen, he was led by curiosity, rather than by the hope of seeing with the naked eye, through the several coats of the Graafian vesicles any ovula in the ovaries, to open one of the follicles with his scalpel, and placing the fluid that came forth upon the platine of his microscope: "Obstupui," says he, "profecto, cum ovulum ex tubis jam cognitum, tam clare viderem, ut cœcus vix negaret. Mirum sane et inexpectatum, rem tam pertinacitur quæsitam, ad nauseam usque in quocunque compendio physiologico uti inextricabilem tractatum, tam facillimo negotio ante oculos poni posse." P. 12. He informs us that this ovulum may, in some specimens of the ovary, be seen through the coats of the ovi-capsule.

Everybody seems willing to concede to Von Baer the honor of this discovery, which was effected two years later than that of Purkinje, viz., in 1827. But, notwithstanding his good fortune as the discoverer, he is not the true expositor of its nature, for he mistook the ovulum or yelk for the Purkinjean vesicle, and he says: "Demonstrabo enim mammalium ova vesiculis Purkinji reliquorum animalium comparandas esse, quas in animalibus nonnullis, molluscis, acepalis v. c. et lumbricis ovorum evolutionem antecedere clare me vidisse puto;" that is to say, "he will show that the mammal ovum is to be compared with the Purkinjean vesicle in other animals, and that the evolution of it precedes that of the ova in certain molluscous creatures, as he supposes to be verified by his observations."

At p. 32, he argues the identity of the nature of the Graafian ova and the ova of birds and spiders, which have a great quantity of vitelline corpuscles and but little liquid, while the Graafian ova bear but few corpuscles and much albuminous fluid. "Besides, they resemble eggs in possessing a vesicle situated in a cumulus, and surrounded with a proligerous layer. *Therefore*, a Graafian vesicle, in view of the ovary, and in general, of the maternal constitution, is the true ovum of the mammal. 'Vesicula ergo Graafiana cum ad ovarium generatimque ad corpus maternum respiciamus, ovum sane est mammalium.'" Von Baer, notwithstanding the tyranny of the schools, almost saw the real truth; for he remarks upon the fact, that the whole Graafian ovum cannot, as in birds, be transferred to the vector tube. "Hence in mammals," says he, "the inner vesicle (the true ovum) contains a richer vitellary matter, and as to the evolution of the fœtus, it certainly proves itself to be a true ovum." In saying this, he was nearly free from the shackles of his scholastic prejudice. They were strong enough, however, to cause him to write of the ovulum, "Ovum fetale dici possit in ovo materno. Mammalia ergo habent ovum in ovo; aut si hac dicendi formula uti licet, ovum in secunda potentia."

The Student, in reading the above, will candidly admit Von Baer's claims, though he will perceive how checked he was by the bonds of an old way of thinking. After all, the egg within an egg was, in his eyes, the true, separate, independent yelk-ball of the mammal.

The ovum of the bitch is $\frac{1}{20}$th to $\frac{1}{30}$th of a Paris line in diameter, according to Von Baer.

Now, notwithstanding M. Von Baer, as by the foregoing appears, is the discoverer of the mammal ovum, it is not doubted that Messrs. Prevost and Dumas had seen it in 1825—the year in which Purkinje detected the germinal vesicle. They, on two occasions, turned out and saw the ovulum of the Graafian ovi-capsule in the rabbit. Yet, the glory is Von Baer's.

As to the history of the Purkinjean vesicle in the mammal ovule, it appears now to be settled that the honor of its discovery belongs to Professor Coste, of the College of France, though several Germans have attributed it also to Von Baer.

M. Coste, in his *Histoire Générale et Particulière du Développement des Corps Organisés*, says:—

"I was at first accused of having copied M. Baer; but, inasmuch as the opinions I had set forth were diametrically opposed to those of that great physiologist, the public early did justice to a reproach so unfounded, and the improper criticisms of Mr. Robert Froriep were promptly repelled by Bernhardt himself, in his inaugural thesis, *Symbolæ ad Ovi Historiam*, p. 25. This reproach having been set aside, an attempt was next made to bestow upon others the credit it was impossible to assign to M. Von Baer. It was pretended that the discovery was made at the same time, *or nearly at the same time*, by M. Coste in France, M. Bernhardt in Germany, and Mr. T. Wharton Jones in England. As to M. Bernhardt, it is enough for me to refer to that author's preface, in which he declares that his experiments were instituted for the purpose of ascertaining the correctness of my observations. Mr. Jones's publication is later by one year than mine; a statement that might suffice for the present occasion, were it not that that physiologist has himself fully recognized my rights as to the priority of discovery, in his report on Ovology in the *Brit. and For. Med. Review*, No. 32, 1843, a paper in which he lays no claim to it himself, but attributes it to me."

Thus far M. Coste, whose remark as to Bernhardt's preface is correct, as well as his citation of Mr. Jones's paper.

Mr. T. Wharton Jones's words are as follows:—

"By the discovery of the germinal vesicle, in the mammiferous ovarian ovum, the complete analogy between the latter and the ovarian ovum of the bird, &c., was established, and Baer's error regarding it dissipated. The correct view of the matter had been suspected by Purkinje, but he and Valentin had in vain searched for a germinal vesicle, and it was only on renewing their investigations, after the announcement that such a vesicle had been discovered in the rabbit's ovum by M. Coste, that they, Wagner, and others in Germany, were successful in finding it. M. Coste, therefore, as Bischoff observes, must, notwithstanding his very imperfect description and delineation of the germinal vesicle, be considered as its first discoverer."

This, it appears to me, is enough to enable the Student to see clearly the whole case; and I shall not further cite M. Coste, in his warm reclamations against M. Bischoff of Giessen.

It is much to be regretted that, amidst the tranquil pursuits of letters and philosophy, there should arise occasions for reproach—the more, as so much honor always remains to be shared by the diligent members of the Republic. The world is very ready to acknowledge the services and merits of all those wise, learned, and good men, who, like Purkinje, Baer, Coste, Wagner, Jones, Pouchet, and Bischoff, have in their publications endowed mankind with an impayable benefit.

The discovery of the mammal ovum was rendered complete by the detection, in 1830, of the macula germinativa or germinal spot, which is diversely attributed to Professor Rudolph Wagner and Mr. T. Wharton Jones; and it may be esteemed a conceded point that it was contemporaneously observed, as it was contemporaneously described, by those gentlemen in Germany and in England.

The germinal spot is, by Wagner, in his *Prodromus Historiæ Generationis Hominis atque Animalium*, page 4, called *primitive Keimschicht* and *maculæ germinativæ*. Professor Wagner, in a note, page 44, Part I, *Elements of Physiology*, says:—

"I was myself the first to discover the germinal macula. I also described and figured the whole ovum in its successive stages with greater care and sequence than had yet been done."

Wharton Jones says: "At one side of the germinal vesicle there is a small, round, dark spot, discovered and described contemporaneously by Rudolph Wagner and the author of this report." (*Brit. and For. Med. Review*, 1843, p. 517.)

The germinal spot is from one-two-hundredth to one-three-hundredth of a Paris line in diameter. It consists of a collection of grains. Wagner's words, *Prodromus*, p. 4, are: "If the germinal vesicle in man and in the mammifers be carefully examined with the microscope at four hundred or five hundred diameters, there will be seen in one part of the vesicle a dark round spot."

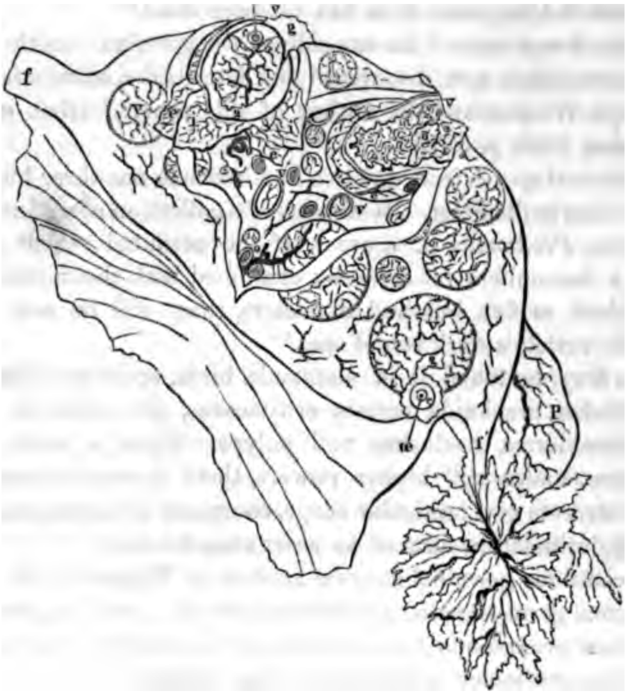
In this way, he found it in mammals, birds, scaly amphibia, cartilaginous fishes, arachnids, certain crustaceans, all mollusks, conchaceans, echinoderms, medusans, and polyps. Upon a more minute examination, under still higher powers, there is seen a compressed orbicular stratum of a lenticular shape, composed of minute molecules, closely agglutinated in form of an acervulus, &c. &c.

This granulous germinal stratum appears to Wagner to be the true living animal germ, existing antecedently to the act of impregnation. "*Hoc stratum granulosum germinativum, germen animale verum et vivum* jam ante prægnationem præformatum esse videtur."

Having now laid before the Student this account of the ovary, I shall annex a copy of M. Coste's magnified view of the ovarium from his grand atlas. In that superb plate, the figure is ten inches in its greatest diameter. Mr. Gihon has reduced it to this size. It was necessary to make it not more than four inches in diameter.

M. Coste's intention was not merely to exhibit the shape of the ovary greatly magnified, but to show the internal structure of it, and the various phases of the ovarian ova and their ovi-capsules during their maturation and the dehiscence and evacuation of the follicles. It is the left ovarium that is represented. The expanded fimbria *p*, of the Fallopian tube *p*, is seen at the lower and right extremity of the drawing. Near this angle is seen a Graafian follicle *v*, the dehiscence or rupture of which has allowed a yelk, surrounded by its proligerous disk or cumulus, to escape. The opening has taken place through the tunica albuginea and the peritoneal coat, and the ovule marked *œ* is still resting upon the exterior surface. Just above it is seen another less mature vesicle *v*, and a still smaller one above that,

Fig. 44.

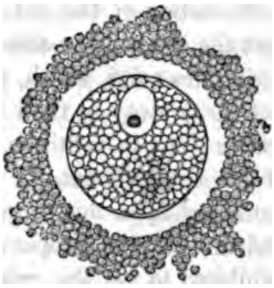


while farther to the left is a very small one. The line of incision passes, near its lower angle, across a pretty large and superficial follicle, one-half of which is seen through the coats of the ovary, while the other half is quite uncovered by the dissection, which has laid the organ open to view. To the right and upwards from this point is seen an emptied Graafian cell *v*, in which *e* is the outer surface of the whole cell. At *v* is the point of dehiscence, through which the egg escaped. This Graafian cell consisted of two coats or membranes, one contained within the other. The broken laciniæ of the double ovisac are seen at the upper end, near the margin of dehiscence, where they are marked *g* and *i*. These two coats are better represented in the follicle at the upper and left extremity of the cut—in which their floating and distinct membranes are seen at *e* and at *i*, whereas *g* indicates the granular deposits upon the inside of the follicle, which is called the tunica granulosa, or granular membrane. This granular membrane is so little tenacious that upon puncturing and compressing a cell, it flows out with the water, and appears upon the microscope as a collection of innumerable grains, that are probably cytoblasts.

Very near the superficial segment of this ovarian ovisac is seen the ovulum inclosed within its proligerous cumulus.

In order that the Student may here have a more complete idea of the ovary, I repeat the figure 45 of the human egg, taken from Rudolph Wagner's *Prodromus Histor. Generationis*, in which is seen the pellucid ring, surrounding and inclosing a quantity of yelk corpuscles, among which, near the top, rests a transparent vesicle with a dark spot upon it. The pellucid ring is the zona pellucida of the egg, outside of which is a quantity of granulous membrane that always comes out of the Graafian follicle sticking to the pellucid zone. It is necessary to remark that this figure is greatly magnified, for a very strong sight is required to enable any one to see without a lens the egglet, whose diameter is but the twentieth of a Paris line. The grains inside of the pellucid zone are grains of yelk—or vitellary corpuscles. They are yelk, true yelk, like that of a bird's egg. The oval transparent vesicle within them is the germinal vesicle, and the dark spot upon that vesicle is the macula germinativa—tache embryonaire—or germinal spot.

Fig. 45.



If the Student will look upon the germinal spot as the nucleolus, the germinal vesicle as the nucleus, and the vitellary membrane as the cell, he will have an idea of a true independent cell, possessing the metabolic and plastic forces that can enable it to develop itself wherever the proper cytoblastema, or pabulum, is afforded to it for that purpose—*i. e.* in the ovary, the tube, or the womb.

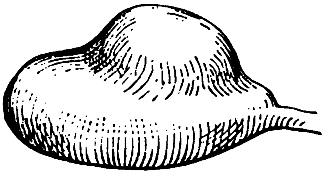
The production within the ovary of an ovum containing within it a germ, possessing, after its fecundation by the male, the power of evolution solely in the direction and dimensions of its own genus and species, is one of the most mysterious and wonderful works of God; one well fitted to overwhelm the mind with astonishment and make us feel amazed at the vastness and the indispensableness of those forces that are communicated by a Divine power to the simple and microscopic elements of the macula germinativa.

Burdach, in his *Physiology*, t. i. 87, speaking of the tubular ovary in which the materials of yelks are secreted in the cavity of the ovaries, in order to become ova, presumes this to be the mode in which ova are formed in all the insects, in most of the inferior crustaceans, in worms, and in certain mollusks. "Moreover," says he, "there is not the least doubt that the substances of which the egg is composed, acquiring through the influence of the ovary their aptitude for a more elevated range of life, or already possessing it, tend partly also of themselves to take on a determinate form."

Is it a new creature that is formed out of the macula germinativa? is a question that has often been asked; or is it a propagation and continuation of the old or parent substance? M. Huschke proposes that the ovary is an aciniferous organ, and that the germs of the offspring are acini, which, under a physiological law, become deciduous, but carry away in their fall the vitality and accompanying forces that enable them to continue, after their separation, the pre-existing career of life development. I do not feel myself competent to speak with authority upon this proposition; I shall only state that very numerous and careful microscopic examinations of the ovarian stroma have not exhibited to me the evidences of the aciniferous nature of that substance; wherefore I am the more inclined to adopt the opinion of the cytoblast character of the germ point.

The Corpus Luteum.—Before I conclude my remarks upon the ovary, I ought to say something on the subject of the corpus luteum, a topic that has elicited an immense amount of discussion, and which still, perhaps, remains a *vexata questio.* Perhaps the principal interest that society has in the settlement of this question is one of a medico-legal nature; for although inquiries in this direction, of a medico-legal character, have not, so far as I am aware, led to any judicial decisions, I can conceive that important rights and interests might depend before a tribunal upon the views to be held as to the nature and interpretation of that singular product.

Fig. 46.



The corpus luteum, or yellow body, is a peculiar substance found in the ovaries of animals that have lately passed through the rutting season, and in women that have lately been affected with their menstrua, or that have become pregnant. In some pregnant women, the corpus luteum is either very small, or not readily discernible. In others, it attains a large size. In the cow, the corpus luteum (*vide* Fig. 46) is sometimes half as large as the ovary. It has been regarded as a sure sign of fecundation. I regard it as a sign of a finished ovulation.

On the 18th December, 1846, I made to the American Philosophical Society a verbal communication, setting forth certain views I had entertained as to the vitellary nature of the corpus luteum; and on the 15th January I read a memoir upon the subject, which was published in the *Transactions*, 1847, p. 131. In that communication I stated that, since the date of my first verbal memoir, I had carefully made researches both with my Chevallier's microscope and by other methods, as to the comparative appearances of vitellary matter taken from the egg, and matter procured from fresh corpora lutea.

These renewed researches leave me very fully convinced that the yelk of eggs, and the yellow matter found in a corpus luteum, are of the same apparent structure, form, color, odor, coagulability, and refractive power.

Having placed a small quantity of yelk on the platine, and just before I had brought the object into the focus, I have been struck with the appearance of the transmitted light; a bright yellow, which fills the whole tube of the instrument.

When I have, in like manner, placed a bit of fresh corpus luteum, of the cow or sheep, on the compressor, and have crushed it, by turning the screw, I have found the tube filled with the same tinted light, before obtaining the focus.

A portion of yelk placed beneath the objective, exhibits numerous granules, corpuscles containing a yellow fluid, and oil-globules, mixed with a quantity of punctiform bodies.

Upon turning the screw of the compressor on a small lump of corpus luteum, carefully dissected out from its indusium, there is seen to escape from the crushed mass a quantity of granules, corpuscles filled with yellow fluid, oil-globules, and punctiform bodies swimming in a pellucid liquor.

The appearances observed upon examining a portion of yelk and a portion of corpus luteum, are so similar that it would be difficult, I think, to discriminate between them, but for the exception, that along with the vitellary corpuscles and granules and globules of the yellow body, there will be found flocs of laminated cellular tela, blood-disks, and other detritus of the organ, destroyed by the compressor.

The transparent corpuscles transmit a yellow light, whether observed singly, or in clusters, or acervuli.

The same is true of the corpuscles of the yelk.

On crushing a bit of corpus luteum with the compressorium, there escapes much granular matter that accurately resembles the granules of the granular membrane, the proligerous disk or the retinacula of the Graafian follicle. This is the case even when great precaution has been used to procure the bit from the outer superficies of the corpus luteum—avoiding to take any portion that might have touched the inner superficies of the crypt left by the escape of the ovulum.

The similarity in the appearances leads me to suppose an identity of nature and origin.

I think no person accustomed to the use of the microscope could detect any difference between the molecules pressed out of a bit of corpus luteum, and those that escape from a crushed mammiferous ovule, or the yelk of an egg, excepting the debris or detritus before mentioned, which is plainly referable to the destructive power of the compressorium.

I have so many times examined the mammiferous ovulum that I suppose myself quite competent to compare its contents with those of the corpus luteum, and with common yelk.

I hope I am entitled to say, that the coloring matter and the chief constituent bulk of a corpus luteum, is a true vitellary matter, deposited outside of the inner concentric spherule, or ovisac of the Graafian follicle.

For the proof of the truth of this opinion, I refer to the future observations of the micrographers, who will be able to confirm or to confute my statement.

There is not, so far as I know, any author who has taken this view of the constitution of the corpus luteum—though that substance has been the fruitful topic of elaborate research and hypothesis, owing to the interest connected with it both in a physiological and medico-legal relation.

Previous to the year 1825, when John Evangelista Purkinje fortunately discovered the germinal vesicle of the unfecundated egg; and down to the year 1827, when Ch. Ern. V. Baer detected the mammal ovum, whose germinal vesicle was detected by Coste; and the year 1830, when Rudolph Wagner ascertained the existence of the *Keim schicht*, or macula germinativa, all notions and opinions on the mammal ovum may be set down as naught—since the opinions of the learned are now based on the discoveries just mentioned, which have led to a complete revolution in many most important construings of physiological action, and therapeutical indication and treatment.

It would be bootless, therefore, to ask what the writers of an earlier date than 1825 may have supposed upon the subject of the corpus luteum.

Dr. Carpenter, John Müller, Thomas Schwann, Henle, and Huschke, have not hinted at the vitellary nature of the yellow body.

Dr. Henle, in his *Algemeine Anatomie*, says: "So weiss mann namentlich, wie die Gräfschen Bläschen, im folge der congestion welche den fruchtbaren beischlaf folgt, erst anschwellen und den platzen, wahrend sie zugleich von Blutt angefüllt werden, welches sie almahlig entfarbt, organisirt, und in eine narbensubstanz verwandelt, die zuleszt verschwindet."—P. 894.

In this paragraph, Dr. Henle attributes the swelling and the bursting of the Graafian follicle to the congestion attending a fecundation. He says the ruptured cell is filled with blood, which colors it, becomes organized, converted into a scar-like substance, and then, at length, disappears.

Dr. Huschke, in his Treatise on Splanchnology, elaborately details the opinions of authors on the corpus luteum; but nowhere alludes to the vitellary nature of that body.

Dr. Gendrin, M. Maygrier, Dr. Robert Lee, Wharton Jones, M. Raciborski, Ollivier D'Angers, M. Pouchet, make no mention of it—though they all enter into details.

Dr. Montgomery, Dr. Swan, and, I think, Dr. Patterson, speak not of it.

M. Flourens, and M. Velpeau, and Dr. Moreau, omit all allusion to the vitellary structure of the substance.

Bernhardt, who was assisted in the construction of his *Symbolæ ad Ovi Mam. Hist. ante Prægnationem*, by Dr. Valentin, in which admired work is contained a complete deduction of the whole literature of the corpus luteum, alludes not to the idea.

Von Baer's celebrated letter, *De Ovi Mam. et Hominis Genesi*, says of the corpus luteum, at page 20: "Me judice, minime corpus novum est, sed stratum internum thecæ majus evolutum;" which expresses, with sufficient clearness, the opinions set forth in the rest of his paragraph.

Dr. Bischoff, of Heidelberg formerly, now of Giessen, in his *Entwickelungsgeschicte der Saugthiere und des Menschen*, says, at page 33:—

"Wenn mann die erste entwickelung des gelben Körpers, unmittelbar nach austritt des eies, bei Thieren beobachtet hat, so kann mann darüber nicht in zweifel seyn, dass die bildung seiner masse von den inner fläche des Graafschens Bläschens ausgeht. Da sich nun hier die aus zellen gebildete *membrana granulosa* befindet, da die zuerst als gelber Körper erkennbarre masse gleichfalls aus zellen besteht, so ist es wohl gewiss, das von einer starkeren entwickelung dieser zellen der *membrana granulosa*, die ich auch in der Peripherie des eies noch nachweisen werde, die bildung des gelben Körpers ausgeht."

From this passage, it seems that Dr. Bischoff is not far from discovering what I suppose myself to have discovered; I mean, the vitellary nature of the yellow body of the ovary.

It appears needless to make any further citation in this place.

I shall here offer the remark, that if the concave superficies of the ovisac, or inner concentric, is really charged with the office of producing or excreting the vitellary matter of the ovulum, which must be admitted, even if we allow to that body the metabolic and plastic cell-force (for it must, at least, be the producer of the cytoblastem of the cell), there is no very great difficulty in admitting that the convex or exterior superficies of the same membrane may exercise the same functions as the dominant of those elective affinities which must be supposed as to every vital excrete.

And such a supposition finds abundant support in the analogy of the organs; as, for example, in the periosteal and medullary membranes of bones; which, under certain circumstances, are known to alternate their functional force; the medullary membrane coming to be a depositor of phosphate of lime, instead of a remover; and the periosteum a remover, instead of being a depositor of phosphate, which is its normal office. This mutation of powers, as to the membranes of bone, has so clearly been described by M. Flourens, in his admirable paper on the production of bone and teeth, in the *Annales du Museum*, that it needs no comment.

But I am far from claiming this illustration for my view of the case, strong as I might deem it to be. It suffices for me to know that vitellary matter is germinal matter, germinal cytoblastem; and that the business of an ovary is to produce it—and nothing else in nature can produce it.

As to the microscopic results at which I have arrived, I have nothing more to do than tender them to the micrographers; and I should feel most happy if, these remarks meeting the eyes of Dr. Bischoff, or my kind friend, Dr. Pouchet, those gentlemen should deem them worthy of their attention, and confirmation or refutation. If they prove to be unfounded, I wish them to be confuted by better observers than I am.

As to some other points of resemblance between yelk and corpus luteum, I have now to observe, that boiled corpus luteum becomes hardened, like yelk boiled hard. It is, in like manner, friable and granular, leaving a yellow stain on paper, like the stain from boiled yelk.

Dr. Thomas Schwann found it evidently coagulated, granular, and friable, upon being boiled.

In order to ascertain its odor, I threw a portion of corpus luteum on a live coal;—it gave out a strong odor of roasted eggs.

Are the granules and corpuscles of the corpus luteum cytoblasts and cells? I have not been able so clearly to make out their nuclei as to speak positively—I suppose them to be so. But Schwann, himself, who in one place seems to regard the nucleus as a *sine qua non* in cell-life, says, at page 204 of that most admirable and extraordinary volume the *Microscopische Untersuchungen*:—

"Die kernloser zellen, oder richtiger ausgedruckt, die zellen, in denen bisjetzt noch keine kerne beobachtet werden sind, kommen nur bei neideren pflanzen vor, und sind auch bei Thieren selten." Non-nucleated cells, or, more correctly speaking, cells in which nuclei have not as yet been detected, are found in the lower vegetables, and rarely also in animals. And he cites, as examples of the non-nucleated cell, the young cells within the old cells of the chorda dorsalis, the cells of the yelk of the bird's egg, &c. &c.

Be the non-nucleated vesicle a cell or not, it is very certain that the milk corpuscle, and, probably, the chyle corpuscle, are of that nature, —and no one can contemplate the amazing reproductive power of a cell or spore of the saccharomyces cerevisiæ, without admitting for it all the properties of the cell-force. It is to the last degree reproductive, as are also many of the filiform fungi, the muscardine, &c.

The question at last is, whether I have made a discovery interesting to the physiologist, the practitioner, and the jurisconsult. If I am right in my opinions, it must be interesting.

As a *résumé*, I say that my views are based upon the fact that—

1. Equal masses of yelk and corpus luteum are equally yellow.

2. They alike fill the microscope, before the focus is got, with a brilliant yellow light.

3. They alike consist of a pellucid fluid, in which float granules, corpuscles containing yellow fluid, oil-globules, and punctiform bodies.

4. These bodies, placed on the same platine, and diligently compared together, exhibit the same forms, size, tint, and refractive power.

5. Yelk, boiled hard, is granular and friable; it is coagulated by heat.

6. Corpus luteum, boiled, becomes hard, granular, and friable—it is coagulated by heat.

7. Both substances, raw or boiled, stain paper alike of a yellow color. This experiment was repeated after Bernhardt, who says: "Cujus pigmentum aurantiacum (cor. lut.), admotis digitis adhærescebat."—P. 89.

8. There is this difference: The crushed mass of corpus luteum contains patches of laminar cellular tela, detritus, and blood-disks forced out by the compressorium; which cannot occur in the yelk, as that is contained within a vitellary membrane, in which its corpuscles are free; whereas, in the corpus luteum, they are confined by the deli-

cate cellular substance lying betwixt the concentric laminæ of the Graafian follicle.

9. They refract alike.

10. Projected on a live coal, they alike give out the odor of roasted eggs.

As I derive this view only from my own perceptions, I ought perhaps to take leave of the matter here, committing it to more capable observers, in order to know whether they perceive it as I do. But, supposing that farther observations may probably confirm my views, I see no objection why I may not now offer some remarks, in the way of a rationale, upon the point in question, the more particularly, as I hitherto have relied only upon my own observations.

I therefore state that all living beings are results of the operation of a reproductive or generative force.

This is true both as to plants and animals; with the *possible* exception of certain fissiparous and gemmiparous creatures, as well as of certain sporiferous fungi, and some creatures of a higher scale, as the nais proboscidea, &c. I say of these, that they constitute a *possible* exception to the law of reproduction by germs. I do not say they are exceptions.

This reproductive force has the same relation to the conservation of the vegetable and animal genera, as the force of attraction has to the conservation of the brute masses of matter of the universe.

For it is obvious that, but for this force, all the genera would die out in a single generation, and yet it is apparent that nothing is more permanent than the genera, which extend from age to age, touching the beginning, the whole course, and the end of time. The existing genera are the same to-day as at the commencement of the present cosmic career, and are destined to be so until the last great cataclysm of the globe. M. Flourens, in his work on generation, makes use of the *mot*, the saying, *un être collectif*, a collective being, in speaking of the immutable permanence of a genus. This fine saying leads the mind at once to a view of the importance of the law of genesis by which so great an end is attained.

It would, perhaps, be superfluous to say that, but for the exercise of this force, all *morals* would be nullified and blotted out of the great scheme of Providence; for, should the genera fail or die out, the earth would become a desert; no flowers to bloom—no corn, nor wine, nor oil—no insect to sport in the sunbeam—no song of birds—no lowing of cattle—no voice of man to acknowledge, and praise, and give thanks to the Giver of every good and perfect gift. Thus the whole scheme of morals would cease and be terminated, leaving no witness here to the power of God, beyond the senseless play of the elective and gravitating attractions.

Is it not clear, then, that the laws of this great conservative force must be most important laws? Can such great forces have little or no concern with the regulation and co-ordination of the other life forces? I repeat, that for life they have the same importance as appertains to the laws of attraction for the physical bodies of the globe.

This force is the true development force, not for the germ only, but for the embryo, the fœtus, the child, the youth, and the man. He who shall know it truly, shall know the laws of life.

It is not only a genetic, but a generic force. It determines the form and dimensions of the members of the genera in an interminable succession of ages. No horrid passion, no wild lust, no insane desire, can contravene the irreversible law of the distinction of the species and genera—"each after its own kind,"—which, but for its provisions, would rush into chaotic confusion and mixture—whereas they are, in truth, trenchantly divided, and set apart from each other, and forever maintained pure and unmixed.

This force—this amazing force, is concentrated and summed up in a special animal or vegetable tissue. Nothing in animals, save a vitelliferous tissue, can yield or give out this force. It is the endowment of the ovarian stroma. It is the peculiar life-property of that concrete, and of nothing else.

The stroma (Lager) of ovaries is a tissue developed and sustained by the combined agency of a spermatic or ovarian artery, and a spermatic nerve.

The spermatic nerves possess an intimate plexual and ganglionic relation to the spinal, the sympathetic, and the splanchnic systems of innervation—so that they are related, in fact, to all the organisms.

Under the dominant formative influence of the spermatic nerve, the ovaric artery, by its branches and termini, deposits the materials of the concrete of the stroma, with all its parts and mechanism.

The general relations of the ovary to the whole of the innervations, while they enable it largely to influence them all, render it liable to disturbance by their derangements. Its great influence is exhibited in pronouncing the single word sex, for the ovary is the sex of the woman—the female in the abstract. But if the ovary be her sex, then the whole peculiar physical, moral, and intellectual character of the female are derived from it, as their source and dominant—they are conformed to its wants, its powers, its offices—and often pathologically modified by its conditions.

The materials of development for all the organs are derived from the blood, which, without violent misapplication of the metaphor, may be said to exist within a multilocular cyst, of which the cellulæ are the different sanguiferous tubes and sinuses of the vascular system. It is everywhere the same, and presents in each of the organs the same liquor sanguinis and disks—so that, although all development is effected at the expense of the blood, yet there is a constitutional, or esoteric nerve-force, by which to compel those elective attractions through whose power every living concrete is produced.

The physiologist knows that this esoteric force is nerve force—and he will not deny that, for the development of both a general and special anatomic structure, it must possess what I desire to characterize as a generic force, else all development would be in spherical forms, and of the same constituent elements.

No power can so modify the generic force of the cephalic extremity of the nascent embryotrophe as to protrude from it a pelvis or a foot; nor could a leg be possibly developed in the place of a prehensile limb. Even in the quadrumana the law holds good.

A liver whose development depends on its nutritious artery and its nerves, could by no means be formed at the caudal or cephalic pole of a mammal. It must always have its central position. No example will be found of a lung placed below the diaphragm. Hence, I say, the law of generic development is a law applicable not to the creature only as a whole, but to each of its several constituent parts. The whole business of zoological classification depends upon this law.

This law not only operates during the embryonal, the fœtal, and the puberic development, but is in force throughout the whole duration of life, perpetually repairing the organs, and maintaining their *generic* forms, against the wasteful detritus of life, until the cessation of life.

The membrana germinativa of the ovum, which is probably R. Wagner's macula (Keimschicht), is an elliptical or circular disk. Let me repeat what I just now said, that no power could determine the production of the pelvic at its cephalic, or the cephalic at its pelvic segment, nor a leg from the thoracic, or of an arm from the iliac region of the disk. Hence it is true to say, that such disk is endowed at different parts of it with a generic force, operative only in that one sole direction. I say generic, since the idea is applicable to all animals whatever, and to all the parts of animals.

My motive for making the foregoing remarks is, that they might serve as an induction or basis as to the generic force of *ovaries*.

An ovary is developed by an ovaric arterial trunk and its branches, drawing the vital current from the aorta or the emulgent, and attended by the spermatic nerves, which I regard as reproductive nerves, and generic in their powers.

I say reproductive nerves, since their innervative force is devoted to the evolution of germs: no other nerve has such a mission.

If Huschke's pretty idea, that each Graafian follicle is a cast-off acinus of the stroma, carrying away in its fall an endowment of vital force rendered complete and generic by an act of fecundation, should prove to be well founded, I cannot escape from attributing this reproductive quality to the spermatic nerve.

But, without discussing the question of the aciniferous nature of the stroma, the same attribution of the nerve-power is right, even under the hypothesis of an independent cell-life—for a reproductive cell could not exist but for the vitellary cytoblastem provided by the stroma, which is a vitelliferous tissue, and only that. Nothing else is so. The nature of the cytoblastem must determine the differences of cells. The cytoblast of an oak germ is different from that of a cabbage germ, nor could they have the same cytoblastem.

But the sole office of an ovary is to produce or prepare germs—it is germiferous, and it is so by its power to form vitellary matter. No other combination or arrangement of animal materials can produce yelk or vitellus.

The complete germ is contained within a vitellary membrane—which is the boundary of the yelk. In the mammals, this yelk is microscopic. In the ostrich and the cassowary it is a very large ball, as it is in some of the larger ophidians, as in the coluber boæformis, &c.

The matured germ contained within a yelk is spontaneously and periodically extruded from the ovary, in order that it may be fairly exposed to the contact of the male fecundative element—which should be deemed impossible while it is buried within the recesses of the ovarium, covered by the double tunic of the follicle, and beneath both the fibrous and peritoneal indusium of the organ.

To effect this extrusion, this spontaneous oviposit, the inner concentric spherule of the follicle is compressed by the deposition on its external convex surface, of yelk grains, corpuscles, oil-globules, punctiform bodies, and pellucid fluid—the beginnings of the corpus luteum—which gives to the concave surface of the cell an appearance of corrugations or convolutions like those of the brain, and which, as they daily increase by the continued deposit of yelk matter on the exterior, constantly reduce the size of the interior dimensions of the follicle, urging its contents towards the least resisting point of the surface of the ovary, until, at length, the *porule* or *hila* being opened, by the dehiscence of the coverings or capsule, the ovulum escapes into the fimbria, or falls into the peritoneal sac.

After the escape of the ovulum, the yelk-producing force is not in all cases immediately exhausted; hence the growth of the corpus luteum continues for a term whose limit is not yet known.

It is a periodical exacerbation of biotic force that matures and opens the Graafian cell. When the process of completing a germ and expelling it has been finished, the exacerbation ceases sooner or later, and a new periodical exacerbation of this strange life-force—or germ-producing force—is devoted to the maturation and spontaneous oviposit of another ovulum, and so on in succession, during the menstruating life of the woman; at every successive pairing season of birds; and at the annual rutting time of the more considerable mammals, and in all the migratory fishes at stated times.

It surprises me to see that many able and distinguished writers still cling to the antiquated notions as to the ovaric fecundation, which M. Pouchet has shown to be an impossibility. It appears to me that my view of the vitellary composition of the corpus luteum, and the mechanical result of its accumulation in effecting the oviposit, ought to be received as satisfactory rationale of the germ-depositing function. The fecundation of germs is a mystery which I deem beyond human cognition—and likely ever to remain so. The inquiry into the corpus luteum is far more feasible and practicable. No woman can menstruate but coincidently with, and in consequence of, the oviposit. Every oviposit is followed by a corpus luteum, which is larger or smaller, according to circumstances. Many women have scarce discernible ones after conception—others have very large ones. The true and the false corpora lutea differ only in magnitude—not in their essential nature.

I have no doubts as to the essential identity of nature in the corpus luteum of pregnant women and that of the virgin; and am pleased to find that the author of that admirable work, "*Die Geburtskunde mit einschluss der Lehre*," etc. etc., Franz A. Kiewisch, entertains the same opinion. It is true that this author appears not as yet to have learned the reasons for supposing the corpus luteum to be a vitellary material, or, at least, that he has not accepted that rationale of the corpus luteum. Still, he is evidently a careful observer, as well as good thinker.—He says, p. 80: "Da diese Erscheinung bei der Lehre von der Schwangerschaft erst genauer erötert werden soll, so schicke ich hier fur die Bemerkung voraus, das die Folliculareste bei jungfräulichen Individuen, obgleich sie in der Regel sehr unbeträchtlich zu sein pflegen, doch dieselbe Bedeutung haben, wie die bei schwangern vorkommenden gelben Körpern, und dass ich in cingelnen scltenen Fällen auch bei nich geswhangerten Individuen bis zu Kirschengrosse entwickelte und gleichfalls exquisite gelbe Körper vorfand." Kiewisch says that the remains of the Graafian follicle, left after the ovulation in maidens, obey the same law that rules in the cases where conception has followed the ovulation—and where a true corpus luteum has been developed. He further says that, in some rare cases, he has found in the virgin the exquisitely characterized *corpus luteum* as large as a cherry.

In the first edition of this work, published in 1847, my statement of the corpus luteum stands as in the foregoing, and I have purposely left the text up to this point unchanged.

The preceding pages may show how considerable a mass is the literature of the corpus luteum, and how varying are the opinions heretofore entertained upon the subject.

It was on the 18th December, 1846, that I read my paper on the corpus luteum, at a meeting of the American Philosophical Society, and that paper was ordered for publication in the *Transactions*.

Deeply convinced as I was that I had fallen on a true and demonstrable rationale of the corpus luteum, I was willing to wait for the decision of the learned as to the truth of my explanation. Some of the reviewers treated me with less than civility for my innovation; but I perceived that they had condemned me on a *primâ facie* examination, and that their opposition depended rather upon a usual reluctance to abandon opinions already adopted, than upon any improbability of the truthfulness of my statements of the subject.

Professor Coste, whose second part of his 1st vol., on the development of organic bodies, was published in the summer of 1849, has adopted my views as to the vitellary nature of the luteal body. M. Coste regards the inner membrane of the Graafian follicles, and not the magma reticulatum lying betwixt the inner and outer cell, as the seat of the deposit. It is a matter of small moment, this, though I by no means yield my opinion on the authority of even so great a name as his.

Having sent my paper, from the *American Philosophical Transactions* of the year 1847, immediately upon its publication here, to M. Coste, I cannot withhold the expression of the surprise with which I find him acknowledging the receipt of it, and at the same time saying (in 1849, two years later), that I have arrived at the same conclusions with himself on this subject; that is to say, he got my paper in 1847, and, adopting my exposition, says, in 1849, that I have attained to the same views as he there so elaborately sets forth.

In order that the American Student may have an opportunity to become acquainted with M. Coste's views, I here translate from his *Dev. des Corps Org.*, p. 251, the following passages:—

"Indeed, upon examining with the microscope the texture of the internal layer of the capsule a short time before the period of its rupture, we find that, besides its abundant vascular network, it is exclusively composed of small vesicles or cells, each containing colorless molecular granules; but immediately after the dehiscence, they become so greatly developed that, when the convolutions fill up the cavity, they are found to be five or six times larger than they were at first. Hence it follows that the membrane whose wall they constitute must be proportionably thickened. It also becomes softer and more friable, because they cease to cohere so strongly as at first, while the wall itself becomes softened. This is the reason why, at a certain period, the capsular convolutions acquire an encephaloid appearance, the result of a modification both of the constituent vesicles and their contents, as I shall proceed to show. In process of time, a stage is reached in which the disunion of the vesicles is so easily to be effected, that it may be done by merely scraping the capsule, which detaches nearly the whole of them, after which nothing is left save the naked vascular branches that run along every plait. I have made this preparation in several follicles previously injected, so as to be able to see the facts in the clearest manner, as I have here described them.

"In proportion as the constituent vesicles enlarge, the contents are appreciably modified. In the cavity of each one of them is formed an innumerable quantity of molecular granules which renders them more and more opaque, and which, under the slightest pressure, pass out through the containing walls, that give way by laceration. These granules are remarkable, not only for their number, but also for the yellow tinge which slightly colors them. Now, as they are very abundant, and closely packed within the vesicles that contain them, it follows that the yellow tinge that is slight in the individual granules becomes very decided as for the whole mass of them. It appears that something takes place here like what occurs in the vitellus of the bird while taking on its yellow hue. I have, indeed, already said, while explaining the material conditions of this phenomenon, that it is produced by the crowding together of the granules with which the yelk corpuscles are gradually filled, and by the admixture of the oleaginous particles that are disseminated in it. The color of the corpus luteum seems to depend upon an analogous arrangement of the material contained in the voluminous vesicles that compose its mass," &c.

Let the Student do me the favor to compare this account by the learned Frenchman with that in the first edition of this work, and I feel sure he will do me the justice to admit the priority of my solution of this long questioned problem.

I beg leave to make one more quotation, which is from M. Coste, p. 268: "Baer first understood the mechanism by means of which the plaits and convolutions are produced. Pouchet showed how they become thickened; and I think I can establish the fact that the color of them depends exclusively on the nature of the molecular granules or the globules with which the cells that form these walls are filled, and not at all, as supposed by Raciborski and Pouchet, on an extravasation of the coloring matter of the blood. I have observed with pleasure, in a pamphlet sent to me by Dr. Meigs, that, in the last respect, that observer had come to the same conclusion as my own."!! Prof. Coste should have said that he adopts Dr. Meigs's views in this last respect.

PART II.

THE PHYSIOLOGY OF REPRODUCTION.

CHAPTER VI.

MENSTRUATION.

WOMEN are subject to a discharge of blood from the genitalia, which returns very regularly once a month. This monthly periodicity of the bleeding has given it, among various people and languages, the name of *menses*, *menstrua*, *menstruation*, *catamenia*, *mois*, *monatliche*, *menstruaçion*, *mése*, &c. Among us, it is called *courses*, *periods*, *terms*, *monthlies*, *monthly sickness*, *unwell*, *times*, and a variety of other names, hints, and allusions, that need not be here summed up.

The discharge is not met with in children, unmarriageable girls, or old women. It appertains to women only as long as they are capable of conceiving. They cease to be child-bearers when they lose the power of menstruation.

In this country the menstrual office usually commences in the fifteenth year of a young person's age, and continues to recur at intervals of twenty-eight days during about thirty years, these returns being prevented from taking place only by pregnancy and its consequences, or by some disorder with which the woman may be attacked. The menstrual flowing commonly continues during three or five consecutive days, and the whole quantity of blood lost at each catamenial period is variously estimated to amount to from four to six ounces. As soon as the flowing or courses have ceased, the woman appears to be in all respects well until the time again approaches for her to be seized with the same kind of hemorrhage.

It is to be expected of every growing girl that she shall have her first change or show about the end of the fifteenth year, although it is very common to observe the first appearance of it at the end of the fourteenth year of her age. Indeed, it cannot be esteemed an uncommon circumstance for girls to have their first change as early as the thirteenth year of their age. It does not, however, invariably happen for the first menstruation to take place so early as the fifteenth, and not a few young women are advanced to the end of the sixteenth, or even far into their seventeenth year before they have their first sign. The precocity or lateness of the first eruption is connected with circumstances so various that it is often very difficult to say why one young person should begin far too early, or another postpone to an inordinately late season the performance of an office having so intimate a connection with woman's whole nature.

The menstrua do not in all cases obey the rule that ordains their return once during each lunation, and many women go to the full extent of the calendar month, or even beyond it, while many others come far short of the lunar revolution, being regular every three weeks, or oftener.

Hence, it appears that though the catamenia are governed by a principle of periodicity, that periodicity is not invariable for the whole sex, and the Student should, therefore, be ready, in any case submitted for his judgment, to decide whether the periodicity as to such special case is or is not normal. My experience as a practitioner has afforded very numerous opportunities to observe erroneous interpretations of this matter, and to confirm my long settled convictions, that every woman, though under this general law of lunar month periodicity, is in fact ruled by a cyclical law of her own individual nature.

In deciding concerning alleged cases of menstrual irregularity, one should not lose sight of the fact, that every sanguineous discharge from the genitalia of unmarried or non-pregnant women is not of necessity to be held as a menstruous evacuation; because it may, and often does happen for women to bleed from the womb or vagina irrespective of their catamenial nature. Yet it is so natural for one accustomed to the periodical flow, to suppose every such flowing somehow dependent on the menstrual office, that we need not wonder to find so many misinterpretations. For example, a woman affected with polypus uteri, is very likely to have some bloody show during consecutive months, or even years, and yet when she consults with the physician on the subject, she is almost sure to speak of the issue as her courses, and say that she has had her courses without interruption for so many weeks, months, or years. An educated physician, however, who knows that menstrual discharges are nothing more than the signs of the monthly ovulations, ought to make no such mistake in diagnosis, nor do I presume to think he would do so except from carelessness.

If the mean duration of each menstrual act is from three to five, or at most seven days, then all the instances in which women complain to us of courses lasting for two or three weeks, or more, should be considered due to some other cause than the ovulations, and treated accordingly.

Women, as has been already shown, develop and discharge a ripe ovule from the Graafian follicle once in every twenty-eight days; but there ought to be no surprise on finding now and then a person in whom the ovulative power is so vigorous as to repeat the oviposit every fourteenth day, or every twenty-first day, and I conclude that all those persons who complain to us of menstruating twice a month, or once every three weeks, do actually mature and discharge their ova every fourteenth or every twenty-first day. Such examples as the above, though to be placed among the instances of menstrual irregularity, are not necessarily to be regarded as cases of bad health, but rather as the proofs of uncommon power of reproduction in the individual. They do not in general require any medical treatment, because they contain within themselves a power of cure, and it will be found that their continuance is not greatly prolonged; since if the too frequent returns result in some degree of weakness, the redoubling of the ovulations ceases with the loss of power; such, at least, are my views of the circumstance, and such are the results that I have many times witnessed. I hope, therefore, the Student will carefully discriminate between sanguineous genital discharges caused by ovulation, and such as arise from polypus, inflammations, cancers, and other disorders that women are liable to.

Ever since the revelation made in 1825 by Purkinje of the existence of the germinal vesicle, which led to the plenary discovery and publication of the physiology of menstruation, the old superstitions on the subject have been decaying and fading out of sight. At the present day, it is almost universally admitted that the last days of the maturing or ripening process of ovarian ovules are attended with a positive affluxion of sanguine humors—not to the laboring ovary alone, but to the entire system of the reproductive organs. In this sanguine molimen the womb largely participates, and becomes the seat of a considerable capillary engorgement. In most women this engorged condition of the bloodvessels of the womb is betrayed by that sense of fulness, weight, and even aching, of which they generally complain. To know the anatomical structure of the womb, particularly its tubular glandules and the extremely delicate vascular network that exists there, is enough to convince any one that a considerable engorgement of those vessels would be likely to exhibit itself not only in the weight, tension, and pain above mentioned, but in actual extravasation of blood from those delicate vessels. It is hardly too much to say, that the tenuity of those coats is so great as scarcely to exceed the thickness and strength of a soap-bubble, so that they easily yield to the vascular engorgement, and bursting, allow the monthly-engorged womb to discharge its surplusage of circulation in the form of women's courses or menses. Such, at least, is the best interpretation of the circumstances that can be at present given, and as it is one that satisfies all the demands and conditions of the case, I have long ago accepted it, and do now believe I shall never change it for another.

In this view, then, I am to teach the Student that the menstrual fluid of women is blood, and that their courses consist in a monthly repeated uterine hemorrhage, and nothing more nor less. The Student, I am well aware, is urged by many able writers and teachers to consider the discharge in question as a secretion, and not as hemorrhage; but it appears to me that no advocate of the doctrine of secreted menstrua will now deny that those discharges do contain a large proportion of true blood, nor that they do coagulate like blood drawn from a vein. I leave it to the Student, therefore, to settle with his own judgment the question, how can blood-disks be subjects of secretory action? Can solids be secreted? Could not a woman as well secrete a watch or a diamond ring as one single blood-disk? Nothing can be secreted that is not fluid. A blood-disk is a solid, and not a fluid. The menstrual discharge is a hemorrhage, and it is the sign that the woman is affected with her monthly ovarian engorgement that has extended to the vessels of the womb: menstruation, therefore, strictly interpreted, is ovulation, and the sanguineous discharge that is vulgarly considered as the principal point, is far less principal than the ovarian ovulation, of which, indeed, it is only the outward mark or symptom. To fail in giving discharge to the monthly outflowing blood, is thus far less important as relates to the woman's health than to fail in the ovulation. The latter failure is evidence of serious embarrassment of the vital forces; whereas failure of the former is due to some want of sympathy between the womb and its ovaries. There are constantly to be met with women, especially school girls, who ovulate with perfect regularity, but who do not give out the sign thereof in a bloody evacuation from the womb; and I may venture confidently to assert that such amenorrhœas are of little import, and demand nothing beyond some judicious hygienic directions.

Inasmuch as I have thus confidently stated the opinion that the menses consist of extravasated or hemorrhagic blood, it seems proper here to compare the analysis that has been made of these fluids, I mean blood and menstrual fluid. It is universally known that healthy human blood consists of water 790, fibrin 3, blood-globules 127, and albumen 80, which equal in sum one thousand parts. The analysis of menstrual fluid made by Denis, and stated at p. 172, of M. de Boismont's *Treatise on Menstruation*, gave of water 825, while the other constituents, as globules, albumen, extractive matter, fatty matter, salts, and mucous substance, amounted to 175; so that while the solid constituents of healthy blood are 210, those of the menses are only 175. Rindskopf's analysis (Simon's *Chem. of Man*, 337) gave 820.830 of water for one trial, and 822.892 for a second trial; while Simon's analysis yielded 785.000 of water, only 5 less than that of healthy blood. In like manner an analysis by Dr. Letheby (*Lancet*, May 2, 1845) gave of water 857.4; so that, taking into consideration the circumstance that the menstrual fluid is destined to pass through the canal of the neck of the womb and through the whole length of the vagina, in which it sometimes lingers on its way, we may understand why the blood of the menstrual hemorrhage should contain somewhat more water than blood taken direct from a vein, since it could not but become more or less mixed up with the moisture of the genital passages. Perhaps these statistical statements are, after all, superfluous for those Students who agree with me that a blood-corpuscle, being a solid, cannot possibly be a thing secreted, but one that can escape from its containing bloodvessel only by an act of hemorrhage.

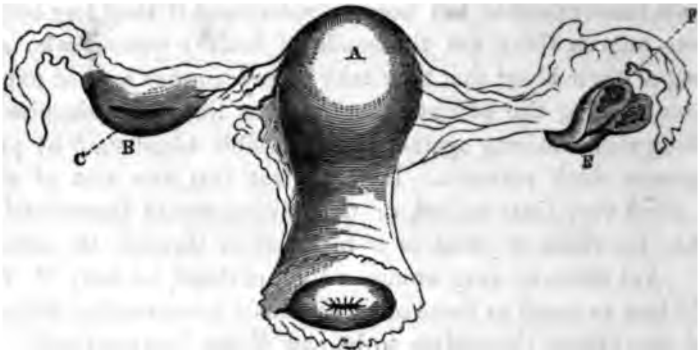
As to our professional measures for ascertaining in our cases whether the patient has too much or too little of the menstruous discharge, it seems proper to put the Student in mind, that as women, while menstruating, usually apply a napkin in the form of a T bandage as a receiver, we can judge pretty correctly concerning the amount by learning how many receivers are necessary from the beginning to the ending of each menstruation. I believe it will be safe, as a general rule, to allow an ounce of blood to each separate receiver, so that if only six be required we may assume that the patient loses about six ounces; but if twelve or eighteen changes are considered necessary, then we may conclude that she does lose some twelve or eighteen ounces of blood monthly.

Though the above quantity seems to be very great, yet I doubt not that thousands of women do part with such a great amount at each catamenial return; and the strangest part of the case is the indifference with which the constitution tolerates so great a periodical waste. I even think it by no means a very uncommon thing to find women who never employ fewer than twenty receivers for each season of return, and it is to be observed that they generally lose a great deal of blood besides what is absorbed by the napkins.

So great are the differences in the menstruation of different women, that while many of them part with eight, ten, or fifteen ounces without the least inconvenience, but become indisposed if they lose only two or four ounces, there are thousands of healthy women who are so sparing of their blood that they take no precautions against exposure —never making use of any other receiver than their chemise—and guarding their modesty against some possible blood-stain by putting on an extra thick petticoat. It is evident that this sort of women must bleed very little indeed, or the flowing would immediately run down to the shoes, or come as a broad stain through the outer garment. Yet these sparing women would, perhaps, be very ill if they should lose as much as those other copiously menstruating ladies, who would also esteem themselves to be sick if not flowing freely. How true, then, is it to say that every woman, in her courses, has a law unto herself, and how important for the Student to know and acknowledge that truth, as a guide in his practice.

In examining the subject of menstruation, the question must somewhere arise as to what is the precise relation of time betwixt the rupture of the Graafian cell and the commencement of the flow. Does the woman begin to bleed before or after the escape of the ovulum from the ovarium? This is a problem that remains to be settled by future observers. In the mean time, I consider it true to say that when a woman's body is examined by the Anatomist, he can always find the opened and emptied Graafian cell, provided the individual should have died while discharging the menstrual blood, or within some few days after its cessation; I have examined a considerable number of such subjects, and never failed to detect the open hila through which the little egg had passed outwards. The vestige is usually a bloody or reddish point. If a probe be pressed upon it, it passes downwards into the empty cell which contained the egg, and generally fills after its escape with some coagulated blood. The wood-cut that I subjoin (Fig. 47) represents the appearances in the womb and ovaries of a young girl who died here on the eleventh day after the eruption of her courses. As she perished with an acute disease, it may be that the healing or reparative processes in the opened vesicle may have been less rapid than is usual. On receiving the specimen, I perceived the open hila from which the egg had escaped, and inserted a probe deep into the deserted cavity of the vesicle. Upon cleaning the margin of the hila, it was plain that the opening had been made by the absorbents and not by any violent rupturing force. The whole of the circumjacent tissue of the ovary was highly injected, and red with full capillaries and small branches,

Fig. 47.



as is commonly found to be the case. I next divided the empty Graafian vesicle by splitting the ovary with a bistoury, carrying the incision down through the middle of the open pore to the bottom of the cyst, which contained the usual clot of blood. The letter A in the figure is at the fundus uteri; the os is seen in the open vagina. At B is the left ovary; C is the trace of an incision made there through a scar left after a preceding ovulation; E is the right ovarium, and F points to the empty crimped cavity of the recently evacuated Graafian cell.

The internal surface of the cell was raised up into convolutions like those on the surface of a brain, an appearance always to be observed, and which depends on the filling up of the space between the outer coating and the inner coating of the ovicapsule. This insertion or impaction of substance betwixt the two coverings causes the inner coat to be crimped, folded, or convoluted as above mentioned, a process which probably tends to press the escaping egg towards the opening hila from whence it is at last, by this mechanism, quite expelled.

The late Dr. Joshua Wallace presented to me a few years since the womb and ovaries of a young woman who died suddenly while menstruating. The cavity of the womb contained a portion of the menstrual fluid. In that specimen I found the bloody pore or hila in the Graafian cell, which as usual contained a clot of blood. I need describe no others of the numerous specimens of the same kind that I have had in my hands; it suffices to say that no woman who dies while in the act of menstruating, fails to exhibit such vestigia to the dissector who seeks for them. Nevertheless, no one yet knows at what moment the hila is prepared, and we have only to consider it probable that the uterine engorgement is coincident with that of the ovaries, and that, as soon as the ovicapsule becomes empty, the lessening of the ovaric tension allows the ovarian molimen to begin to lessen. It is, under all circumstances, most probable that the egg escapes very nearly at the time that the womb begins to bleed, and that the uterus continues to pour out its blood until its vascular congestion and nervous erethism are dissipated by the hemorrhagic discharge.

Writers of a late period have persisted in believing that the discharge of the ovum is due only to an act of impregnation or fecundation ; but the modern Student of medicine knows that the germ could not be fecundated while locked up within the recesses of the ovisac, itself buried beneath the indusium and tunica albuginea of an ovarium. On the contrary, he knows that ovulation being a spontaneous act of ovipositing, fecundation of the egg can take effect only after it has been set at large by the act of the absorbents. Therefore, he also knows that a woman can be subject to fecundation only within some unknown but short season succeeding her menstruation. M. Pouchet, of Rouen, whose learned researches have thrown a flood of light on this before obscure department of physiology, seems to feel quite sure that the period after a menstruation during which the discharged ovule remains subject to fecundation, does not extend beyond the twelfth day, and I cannot gainsay that decision of the celebrated naturalist and physician. I am, however, sure that it does extend to the eighth day, and probably beyond it, because Jewish women among my patients, and very prolific ones too, have assured me that they never did violate what they regard as a religious duty, that commands them to avoid the approach of their husbands until eight complete days have elapsed after the entire cessation of the mensual flux. They have assured me that in a very large Jewish sect this law is scrupulously fulfilled, and if so, we have in this religious custom a positive proof that the escaped egg remains apt for fecundation during the eight Jewish days of abstention. Why may it not also be true that M. Pouchet's law of twelve days is as correctly ascertained? There is surely no reason to suppose that the discharged ovule must necessarily perish or decay sooner than the twelfth day after its separation, since it may lie perdu within the fimbria or in the canal of the Fallopian oviduct, ready at any time to meet the conflict with the male zoosperm, which is fecundation.

However probable or even true it may be that a woman is unlikely to be fecundated later than the 12th day, it is by no means sure that she can safely indulge illicit passions under such an hypothesis, because, while it is absolutely true that ovipositing is a periodical phenomenon repeated every twenty-eighth day, and accompanied with menstrual hemorrhage, it does not necessarily follow that a ripened germ may not, now and then, be cast off irregularly by a vigorous ovarium, without occasioning any hemorrhagic molimen and flowing. A woman, therefore, who believing that the period within which fecundation is possible has fairly gone by, and who consequently indulges in the sexual approach, may be caught and brought thereby to an open and palpable shame. I have been informed by more than one married woman, that her abstention, practising on the above principle, was of none effect.

The former doctrines of menstruation give us no clear indications of a therapeutical treatment of the disorders so frequently connected with that periodical act. It was foolishness to assign as a cause of the menstrual periodicity an influence of the moon, since observation and experience showed to all inquirers that there is no coincidence of the act with any particular phase of the moon, some women being always to be found just beginning, just concluding, or midway between the periods of monthly evacuation.

The doctrine of a general plethora, peculiar to the sex, and required of them as a means to the end of reproductiveness, was easily refuted by the always obvious facts of persons menstruating regularly even when very much reduced by sickness or other causes of oligæmia.

The true doctrine was that of a local plethora, or, in other words, a state of periodical hyperæmia of the reproductive organs; and now that doctrine is not only established, but it is made plain to the understanding, for the periodical paroxysm of stromatic force, that hurriedly concludes the ripening of the most perfect ova, establishes the affluxion that fills the capillaries of the reproductive organs, and engorges them, or renders them hyperæmic to the point of causing the monthly hemorrhage by which the hyperæmia is removed, leaving behind it no trace of indisposition.

This admirable exposition, for which we are so greatly indebted to its discoverers, preserves us from the most serious errors in our practice; while it reveals to us a vast deal of information as to the state and wants of women in whom the catamenia have become disordered, or in whom they have never appeared.

Heretofore, physicians have looked to the bloody sign alone as the act; hereafter, they will be likely to look upon the maturation and discharge of the ovarian ovule as the physiological act of menstruation, and upon the sanguineous effusion only as the sign that the physiological act has been or is being performed.

True menstruation is the regular periodical evolution and expulsion of an ovule; it is ovulation. This act may suffice to cause the woman to bleed mensually, or it may prove insufficient to that end. It is, for the most part, a matter of indifference whether it does or does not cause the mensual hemorrhage; the essential thing is to mature and deposit the ovule. There are many circumstances of the menstruating girl or woman that are able to prevent her from bleeding, notwithstanding she may enjoy all the other faculties of perfect health.

As to the woman—a married woman who conceives in the womb does not necessarily upon that account cease to mature and deposit her germs. On the contrary, she retains a strong tendency to menstruate up to an advanced period of gestation. Yet she does not, as a very general rule, discharge the mensual fluid. But there are many examples of women who do actually retain, in the early months of pregnancy, the power to pour out from the vessels of the womb the usual product of menstruation; an act that must lead them to abortion.

Probably a woman has a much greater liability to abort at the time of her mensual crises than at any other time; which can only depend upon the occurrence of the catamenial effort under the periodical exacerbation of the germiferous force.

The same is true of the woman who gives suck.

A woman with a nursling at the breast does not, in general, menstruate until the child is seven months old; and thousands of women do not menstruate until they have weaned the child. Yet these women are liable to become pregnant; indeed, there are many who do become pregnant again and again before they have weaned their children, and before they have had the return. I say there are many such persons, so many, indeed, that the case is quite a familiar one to the accoucheur. A lady told me, on the 14th December, 1849, that she was pregnant again, and that she had not *seen* since the birth of the child which was born before the infant she was, at the above date, nursing, and which she must now wean before the due time of weaning. Such facts are proofs of the continuance of the germ-production *in* the ovary, as well as of the ovulation.

As to the young girl—a young female who has been brought up at home in the country, is rarely sent to a boarding-school to finish her education without soon finding herself the subject of a catamenial derangement. She may have been perfectly regular at home; but, soon after she takes her place upon the school-form and daily devotes many hours to study, the menses are apt to be suspended, and to remain suspended until she leaves the school, and ceases to consume her nerve-force in those mental or intellectual operations, that require for their effectuation all the biotic force she is capable of evolving. The consumption of this force leaves her destitute both of the power and the necessity to discharge the menstrual blood; not depriving her, however, of the force required to fulfil the true physiological office, the ripening, to wit, and the discharging of her monthly ovulum from the stroma. Her ovulation goes on regularly, and she is well, though not apparently menstruous. I have found many young women thus affected; but, the health being in all other regards perfect, I have not ventured to interfere beyond the interference of recommending a lessened devotion to mental labor, a more abundant and exciting diet, and a proper amount of daily exercise in the free air. Such amenorrhœas cease as soon as the girl leaves school. Similar observations are to be met with in the writings of medical authors.

The pregnant and the suckling woman do not menstruate, because the life-force is fully occupied otherwise, yet they fulfil the germiferous law. In the same way, the studious and sedentary school-girl does not menstruate visibly, because her nervous mass is already preoccupied. She performs, meanwhile, the physiological act of the ovi-ponte or ovulation, yet she does not bleed.

Let the woman miscarry, or wean, and she will soon perceive the visible sanguine sign of her *ovi-ponte.* Let the overtasked school-girl cease to call upon her nervous mass for impossible supplies of biotic force, and her menses will speedily return, and be regular in time and in sum; for her nervous energy is no longer misdirected, and improperly consumed in studies beyond its power of supply.

It is time to say a few words upon the catamenia, as connected with a computation of the commencement of pregnancy.

I presume that a woman cannot be fecundated except it be coincidently with the ovi-posit. As a rule, then, a woman is liable to become pregnant only at, and about the periods of her monthly sickness; and, in computing the commencement of pregnancy, we shall commit the fewest errors if we begin the count at the day following that on which the flow ceased. Two hundred and eighty days should be allowed as the usual duration of a gestation.

One who is regular ought to *see* every twenty-eighth day. If she *sees* for three days only, then she ought to be twenty-five days without seeing.

In what portion of these twenty-five days is it that she is liable to impregnation? Dr. Pouchet insists that the liability extends to twelve days after the drying up of the discharge, and not beyond that time; and it seems probable that the ovule should retain its vitality without fecundation, so long as twelve days after its escape from the follicular pore.

If those Jewish women spoke truly, they gave incontrovertible evidence that the fallen ovule retains its fitness for impregnation, not only during the eight days subsequent to the drying up of the courses, but perhaps longer, since we know not precisely at what period of the mensual act the ovule departs from the cell. In the case already mentioned, of the young girl whose womb and ovaria were given to me by Dr. J. Wallace, the patient died while menstruating, and the uterus still contained a certain quantity of the menses; yet here the crypt was open, and the ovule had already escaped. It might, therefore, be fecundated as soon as the menses should disappear, but not before that disappearance.

In July, 1848, a young girl destroyed herself by taking arsenic, just before the expected return of the menses. Dr. Wistar, of this city, who examined the body, informs me that in one of the ovaries was a blood-red spot, the size of a lentil. There was no absolute rupture of the crypt as yet, nor any blood in the uterine cavity.

I repeat that we do not, as yet, know at what period of the mensual act the vesicle bursts. The above example proved to me that the rupture took place in the young girl, previous to the drying up of the discharge; so that, in the case of the Jewish women, if the same rule holds, we perceive that the ovule may be discharged, and yet retain its vitality without fecundation for eight days, and even more than eight days. But we do not know where it rests in such a case, from the period of its escape from the ovarian ovule, until it becomes fecundated eight days later.

After the foregoing, I am clearly not called upon to say at what precise period after the courses, a woman cannot possibly conceive. I have no doubt there is such a period. Time, and opportunity to observe, can alone settle this point. The celebrated case of the birth of Louis XIV., and the advice of the court physician, Fernel, relative thereto, ought not to be cited, since they have none of the characteristics of rigorous truth. It shows, however, the old date of opinions on this point. I am for the present very willing to believe, with M. Pouchet, that a woman shall not conceive later than the twelfth day, as a general law, though it may be that, occasionally, the fecundation may occur even later.

There are questions connected with this topic that ought not to be lost sight of by the diligent Student, who desires to prepare himself upon all the points of a professional duty. For example—

Some women are to be met with who never menstruate, and who yet preserve a most perfect physical and mental health.

Among these exceptional creatures are to be found those in whom the ovaria or the uterus has never been developed. Dr. Renauldin, on the 28th of Feb., 1826, reported to the Royal Academy of Medicine the case of a woman who died at the age of fifty-two years. She had never had any appearance of menstruation. The breasts were not developed. She had only a cervix uteri, which was of the size of a writing-quill—there was no womb proper—and the ovaries were scarcely developed.

Such a woman could not menstruate because of the double failure of uterus and ovary. There could be no sexual passion; indeed, such a creature was scarcely sexual.

When Percival Pott, the illustrious surgeon, removed the ovaria of his patient under an operation for hernia, he took away with them the power of menstruation. There are numerous examples of females who did never menstruate, owing to the absence of the ovaries. When our domestic animals are subjected to the operation of spaying, they are totally deprived of the power of ovulation; and with its loss the sexual sense disappears as well as the sexual attraction also; or if any remains are discernible, they are very imperfect.

As to the cases of absence of the womb, they are less rare than the former, and ought not to be lost sight of by the inquirer, lest he permit his ignorance to lead people into a grievous unhappiness. A woman ought not to be married who has never menstruated, until it shall have been clearly ascertained that she is not amenorrhœal from faulty development.

I have seen several pretty women who were suffered to marry before it was ascertained that they had no wombs.

All attempts that were made, in either of these cases, to bring on menstruation, are well fitted to cast ridicule upon the physicians. A physician should never be otherwise than cautious in all his dealings with cases of absent or suspended menstruation. I state the following instance, in order to show the evil effects of a want of medical cautiousness.

Mrs. Blank, aged twenty-two and a half years, was married to her present husband more than two years ago. She is of a middling stature and fair complexion, and presents all the exterior appearances of a person in perfect health.

She is not fat, but has a certain embonpoint, a good figure, and a very feminine and most agreeable expression of countenance. She is, indeed, a handsome woman.

She has never menstruated, nor has she suffered from catamenial pain, or severe attack of any disease. Seeing that she did not menstruate at the proper period, medical advice was sought and followed in the treatment of the case. The treatment was unsuccessful, and she was married with the expectation of her friends that the union would be followed by an eruption of the catamenia. The mammæ were, at the period of the marriage, well developed, and the pudenda was amply supplied with hair; indeed, all the phenomena of a perfect development of the sexual system were present except those connected with the menstrual office.

The husband found, however, that some unknown cause acted as an impediment to the congress, and after more than two years of concealment, he consulted me on the subject.

An opportunity being allowed to me for a full investigation in presence of the mother, I found the external organs perfectly formed, the mons large, the labia and the nymphæ, as well as the clitoris, perfect, and the os magnum of a natural appearance; but the vagina was a mere cul-de-sac, not more than two inches, and probably less than that, in length. Upon pressing the point of the finger strongly against the bottom of the cul-de-sac, it seemed to have no connection with any vaginal part above it.

I requested the lady to lie on her back; and, introducing the index finger of the right hand as far as possible into the rectum, I explored with it the excavation of the pelvis, in order to discover any tumor or organ that might be contained within the cavity; but, as all the tissues were ductile and very yielding, I began to suspect that there might be no womb at all in the case. Therefore, laying the fingers of the left hand upon the lowest part of the hypogaster, and pressing them firmly towards the finger that was used in exploring the internal parts, I found that they could be brought so near to each other as to make it perfectly clear that there was no womb in the case; otherwise, I must have felt it, so near was the approximation of the fingers of the right to those of the left hand.

Having, by the most careful exploration in this manner, discovered the unfortunate state of the young lady, I felt obliged, in a conscientious discharge of duty, to tell her the whole truth, which I did in the best way I could; and yet, as may be readily supposed, the knowledge of her situation was accompanied with all the manifestations of that violent distress and agitation which might naturally flow from such unhappy circumstances.

The aphrodisiac sense in this lady is *very strong*, which might well be the case where the ovaria are fully developed, even though the uterus had never been evolved in her constitution.

I was deeply impressed myself with the melancholy fate of two estimable persons, who would never have placed themselves in so unhappy a condition if, by a proper exploration of the parts before marriage, the real state of the case could have been discovered. The case also seems to show how improper it is to permit the rites of marriage to be solemnized for persons who do not possess all the attributes properly belonging to the sexes. I do not contend that every case of failure to menstruate at the proper season is indicative of the necessity for exploration by the touch; but I think no case of extraordinary protraction of an emansio mensium, and especially where any question of contract of marriage is likely to arise, should be allowed to go on without the acquirement, by a medical adviser, of true and perfect knowledge of the facts as to the organization of the parts.

In the early part of the year 1848, I met with another example of similar want of development in a comely young person, who had been married some three months before. A shallow vaginal cul-de-sac at the bottom of well-developed external genitalia, mammary glands of full size, warm aphrodisiac temperament, and abundant hair, showed that all the sexual physical attributes were present, save only as to the absence of the uterus, no trace of which could be detected by Dr. Pancoast, Professor of Anatomy, by Dr. Jewell, of Philadelphia, or by my own careful exploration. No doubts were left upon our minds of the complete failure of uterine development.

CASE.—December 24, 1852, I visited Mrs. ———, S———n St., aged 22, of a delicate form and stature, but healthy and vigorous. She had been married eighteen months, and had never yet menstruated, nor suffered from any catamenial disorder.

The external genitalia are fully developed, and covered with hair, though less abundantly than is seen in many women. The mammæ are well formed, and of rather full size; the nipples large, with very dark areas. The hypogastric region soft and yielding to the touch, as in the healthiest women. Pressing the integuments down to the plane of the strait, no tumor or unnatural resistance is found. The vagina is a thin, membranous cul-de-sac, an inch and a half in depth. I could not discover any central stylus of indurated tissue, as would have been discovered had there been atresia from cohesion of the vaginal walls, whence I infer that the cul-de-sac stops at the bottom of the cavity, which never has been any deeper than now. The sexual desire is strong, and attempts of *coitus* frequent.

I pressed the left index finger as far as I could reach into the rectum, and also a female silver catheter five inches into the bladder. Carrying the point of the catheter backwards until I could touch it with the finger in the rectum, I could ascertain whether she had a womb or no; she had no womb.

I saw a similar case of absence of the womb here on the 3d of January, 1833.

The persons interested in this unfortunate situation, though less sensitive than those mentioned above, were rendered unhappy by so grave a misalliance; probably the last consequences of it may be greatly to be deplored. How important, then, is it that medical attendants, the only persons who can be competent, should be always cautious and watchful as to these points of duty.

Not only on account of the risk of fatal mistakes of the kind above mentioned should we be ever attentive to the duty of making accurate diagnosis, but there are a great many other shoals and quicksands in the track of the young practitioner, who fills his sails with the prosperous and flattering winds of his earliest successes.

He would find himself under obedience to a good rule who should firmly resolve never to pronounce any opinion as to the catamenial disorder until he has taken measures to form a solid and inexpugnable judgment on the cases submitted to his decision.

The consultations relative to this class of diseases are very numerous for medical men engaged in business. Well, let it be a rule to suspect of pregnancy every married woman who complains of amenorrhœa. This, though so obviously proper, is a rule often lost sight of by the medical practitioner, whence it happens that we encounter now and then the ridiculous circumstance of reiterated and vain attempts made by medical men to bring on menstruation in married women, who prove in the end to be pregnant. I have met with many such instances.

Let every married woman who does not menstruate be, therefore, treated as if reasons exist for supposing her to be gravid. If, by the lapse of time, or by the occurrence of circumstances, a solid conviction can be attained that the patient is not gravid, she may be sufficiently early subjected to treatment conformable to her wants.

In like manner, in young unmarried women failing to menstruate, yet exhibiting no other evidence of disordered health, there is always time enough to consider what may be requisite in the treatment. The more especially, if we may believe, which I consider undeniable, that such a woman, healthy, vigorous, and in all respects enjoying the complacency that can only exist in those that be well, either does really perform her physiological act of menstruation—to wit, in the regular deposit of her germiferous ova, yet without manifesting it by the *sign*, I mean the mensual hemorrhage; or else, that pregnancy prevents the exercise of menstruation.

It will, perhaps, appear to be almost a rudeness to make this assertion, and I should not venture to make it in this place, but under a sense of the duty I owe the young Student, which calls upon me to put him early upon his guard. I have so often been nearly deceived in instances of this kind, that I am convinced that nothing but a constant cautiousness has saved me from making the grossest mistakes. Many have been the occasions of my being consulted for catamenial obstruction, with a design to entrap me into the administration of drugs that might remove the difficulty by procuring abortion; but, like all those who will resolve to adopt the rule which I suggested above, I have hitherto escaped so distressing an error of commission. Should a female, presenting all the appearances of brilliant health, complain of such *obstruction*, I should be sure to come to one of the conclusions indicated in the paragraph—viz: either the ovarian stroma is active and regular in the performance of its physiological act of ovulation without the sign, or else that a gravid state prevents the sign of the act from becoming manifest.

CHAPTER VII.

AMENORRHŒA.

A YOUNG woman sometimes is observed to reach the usual age at which the menstrua commence, without having any appearance of the discharge. In this case, she is in a state which is denominated *emansio mensium*, which is one form of amenorrhœa.

When a person who has before been regularly affected ceases to have the periodical returns, she is more properly to be said to have amenorrhœa; for the term *emansio* belongs to the former, and the other term, *amenorrhœa*, to the latter class of cases.

I have already, in letters to the class, fully expressed my opinions as to those puberic conditions that may interfere with the regular exercise of the catamenial office; those that can postpone the first exhibition of it, or derange or suppress it in those who have shown that they had once attained the full power of it.

Many people are met with who become alarmed if the young persons under their care fail to menstruate at the usual age; but I wish the Student to reflect that, while it is usual to look for the event when the girl is about fifteen years old, we have no reason to be alarmed even though she should advance to her sixteenth, or, indeed, to her seventeenth year without *changing*, provided her health should be in other respects good. It is only when the failure to menstruate coincides with some other evident sign of weakness or disorder, that the individual should be held to be, and be treated as a patient.

The power of ovulating should always be looked upon as the complement of the physical forces of the sex; and it is reasonable to believe that instances must now and then occur of girls who, having attained to the apparent perfection of all other physical forces, are unable to rise to the height of this last and finishing evidence of generic and genetic power.

I deem it to be quite consistent with the facts of the case to believe that where such failure to attain to what is called complete puberty (*pubertas plena*), is not clearly connected with some evident topical lesion, the failure should be attributed to an hydræmic condition of the girl. The healthy constitution of the blood is expressed by 210. solid elements, and 790. aqueous portion. A rapidly growing girl, who, in approaching the period of puberty makes excessive demands upon the solid constituents of her blood for the purposes of nutrition and growth, is liable to call for a quantity beyond the power of supply, and so come at last to carry the figure for the aqueous constituent from 790 to 800, or even to 820 or 850, while the figure for the solid constituents, or the true blood, must go down to 200, 190, or even so low as 150.

It should be observed that the blood is in reality the solid constituent, the production of which cannot be effected save by a power of hæmatosis, appertaining to a living solid. The evolution of it must therefore bear some ratio to the powers of the special solid upon which it depends. Such power may be greater or less at different times, and therefore is liable to be more or less completely exhausted. As to the watery portion or diluting portion of the blood, it should be observed that it is not formed by the solids, but only taken in by absorption or endosmose, and therefore costs nothing to the constitution. But the solid elements, such as the fibrin, albumen, and corpuscles of the blood, are products of vital operations and living forces, that may be checked or exhausted by overtasking.

If six hundred ounces might be regarded as the mean quantity of blood in an adult in good health, then it will happen that, when the solid constituents are too rapidly consumed, though the whole quantity within the vessels shall not be less than six hundred ounces, yet the blood shall be weakened by the abstraction of a portion of its essential or solid part, and by the addition to the remainder of a sufficient quantity of water to keep the whole up to the figure of 600; for, in the extremest degrees of hydræmia, the vessels are to be supposed equally full as in the extremest cases of plethora. The difference between plethora and hydræmia is not a difference in the quantity, but only a difference in the proportion of the aqueous to the solid constituents.

I think the foregoing may serve to show that, where a growing girl, by using too abundantly the solid constituents, has obtained an excess of the watery element of the blood, she ought not to be expected to do more than carry on, and that very imperfectly or feebly, the ordinary operations of her physiological forces. It ought not to be expected that she could do this, and at the same time attain to the possession of her complement of forces.

A fruit-tree, in a soil too poor to afford ample nourishment, may live and grow, but it will not blossom and bear fruit, because it is destitute of both the elements and the stimulus that are requisite to nable it to attain the blossoming and fruit-bearing complement of its iving forces. The fruit-tree derives its nourishment from the soil in which it is planted. The blood, on the other hand, is the source whence all the solids of the girl are derived; if the blood becomes impoverished, by an inordinate addition of water to the solid constituents of it, the girl, like the fruit-tree, cannot attain to the complement of her powers.

To show how this impoverished state of the blood, or hydræmia, must act on the health, let me say that the whole class of the insects are supplied with their oxygen by means of tracheæ, the fishes are aërated by branchiæ, while some other animals are furnished with lungs. But whether the machinery of aëration consists of tracheæ, branchiæ, or lungs, the purpose of all this various machinery is clearly to afford a convenient access of oxygen to the molecules of the animal tissues, particularly to the nervous mass of the creature. In warm-blooded creatures, that have lungs, the oxygen can have no access to the tissues save as it reaches them in the blood. Hence the blood is, in such animals, the oxygeniferous medium or organ. It is the transporter or conveyer of oxygen. Where oxygen cannot go, in a living creature, there is asphyxia. If the nervous mass does not receive a due supply, the nervous force is not duly extricated. Nothing appears to me clearer in physiology than this, viz: that neurosity (nervous force, or innervative force) is the immediate product of the combination of oxygen with nervous mass or nerve-corpuscles. Certainly nothing is alive that is not in presence of oxygen, for no living thing can exist in carbonic acid gas, or azote, or hydrogen alone.

Now let the Student consider that the figure for healthy blood being 210 for the solid constituents, what must be the effect on its oxygeniferous power of reducing the 210 to 150? Will he not say that, as it is not the water of the blood that takes up the oxygen of respired air, then, when the figure becomes reduced from 210 to 150, there must be concomitant reduction of its oxygeniferous force, and consequent diminution in the evolution of the neurosity, as M. Cerise denominates it?

Under this aspect, he perceives that he has a clear rationale of the debility of the anæmical or chlorotic girl; he will say that her tissues, especially her nervous mass, being incompetently oxygenated, the fruits of such a state are manifested in great weakness, not of the limbs only, but of all the functions and powers of the economy. The hydræmic girl must hence be weak—weak as to all her functions—

quite too weak to afford us any reasonable expectations that she shall attain to the complement of her forces, while the hydræmia remains uncured.

Although it is quite true that an impoverished state of the blood strongly tends to produce amenorrhœa, there are individuals whose menstrual force is proof against the most excessive hydræmia. Miss ——, a lady about 30 years old, was seized, March 24, 1853, with copious hæmatemesis that left her pale, faint, and much enfeebled. She had weak pulse, cold hands, and was so sunken as to require doses of brandy and water. On Thursday, the 30th, she was somewhat revived, but unable to sit up in bed. Friday, March 31, another very violent and alarming hemorrhage. On Saturday, April 1, no attack, but a violent one came on Sunday, the 2d, and another on Monday, the 3d. By these enormous effusions of blood she was reduced to almost hopeless exhaustion. On Tuesday, April 4, she had a hemorrhage, which was the fifth in the series, and which left her to the last degree hydræmical; yet notwithstanding these dreadful losses, and her almost dying state, her mensual evacuation commenced regularly on Wednesday, April 12, and exhibited the usual appearances for her. This case shows conclusively that a general plethora is by no means essential to the regular returns, and has nothing indeed to do in the establishment of a regular periodical menstruation. I cannot, therefore, see the reasonableness or the hopefulness of attempting the cure by the exhibition of emmenagogues. On the other hand, it is probable that success will crown our efforts, provided they be wisely directed to the removal of her hydræmic malady, for that is the cause of the delay.

This may be done by proper regulation of her diet, her digestion, her clothing, exercise; by change of scene, travelling, suspension of studies; by requisite lapse of time, and, as a medicinal agent, by iron. Attention to these points will very rarely fail to bring about the cure in such cases as I now speak of.

As to iron, I take this opportunity to say that it is iron which the patient requires, and not some certain salt of iron compounded by the chemist. As every act of digestion is accompanied by a process of acidification, the acid produced in the *primæ viæ* will always be capable of combining advantageously with the impalpable particles of iron-by-hydrogen. It is even probable that, where a salt of iron is exhibited by the practitioner, the article is always first decomposed during the chymification, and afterwards recomposed according to the state of the organs of digestion, and that is a work of supererogation for the physician to present to those vital organs a salt, when they want only the base, to do with it what is right, of which their organical *entelechia* can judge better than any *man*. I have come to a conclusion that, since we have obtained the beautiful preparation of Messrs. Quévenne and Miquelard, I shall never hereafter think it necessary to prescribe my chalybeate doses in any other form than that of the impalpable powder procured by hydrogen from the oxides of iron; and that I shall always intrust to the vital chemistry the task of making up the salts for itself.

Let us now advert to other circumstances that may prevent a young woman from menstruating when she has reached the usual age for the appearance of the menstrua.

I need not here speak of those cases in which some considerable disorder of another and important organ or part serves to concentrate upon itself the powers of the living economy, which they divert from a general to a particular use or determination. Among these are all those affections that tend to set up a hectical irritation in the system, such as consumption, chronic rheumatism, or painful and long-continued inflammations of the articulations. These causes of amenorrhœa are too self-evident to require more than an allusion to them; and any sensible man, even in the very beginning of his career, might be supposed capable of seeing in them the causes of the failure, and of trusting upon the cure of them to find the function in question at liberty to establish itself.

It is of more importance that the Student should know that some women are now and then met with who have emansio mensium from the want of a womb with which to menstruate, or of ovaria to provide the sources of menstruation in a regular periodical ovulation.

It happens that organs become blighted, during the embryonal or the fœtal life, and never grow nor develop themselves after the birth of the child.

If these organs are not essential to the mere animated existence of the infant, it may grow up in the apparent possession of all its faculties and attributes. Should such a blight or abortion of an ovary, a womb, or vagina occur, it would be very likely to escape detection until the age of puberty, and then disclose the remarkable truth by a state of emansio mensium.

I have already mentioned several married women, neither of whom had ever menstruated, and ~~both~~ of whom were wholly destitute of any discoverable traces of a womb. Yet each of them was in all other respects a highly sexual creature, being fully provided with all other sexual attributes and marks. But they can never admit of the consummation of marriage, nor menstruate. Their strong sexual propensities gave evidence of the perfection of their ovaries. I have no doubt that all those women performed, with the utmost regularity, the monthly acts of their ovulation, nor that they were the subjects of the monthly ovarian and vaginal hyperæmia; but they gave no visible signs by the mensual discharge of blood. Such cases admit of no medical treatment.

Again, certain women grow up and attain to a good old age, without experiencing any, the least sexual excitement, and without once menstruating during their whole lives. Upon examination after death, it is found that the ovaria were wholly wanting, or that their development having been arrested in the fœtal stage, they had never been evolved beyond their fœtal form and nature. Such cases are also beyond the powers of the medical art.

In some young women, the canal of the neck of the womb, or the cavity of the body and fundus uteri, is found to be annihilated in consequence of inflammation, that has filled the cavities with plastic exudation resulting in a fusion of the walls into one common substance. Such women cannot menstruate, save where the astresia affects only the canal of the cervix. When that is the case, the womb may pour out the blood of the menses, which is retained within its distended cavity. Another and another menstruation adds to the accumulation, until the uterus, pregnant as it were, and distended with the product of repeated menstruations, either causes the barrier to give way through over-distension, or until the surgeon, become aware of the truth, perforates the obstructed canal with his bistoury or his trocar, after which the courses are regularly seen to return with every ovulation.

The uterus and ovaries may be healthy while the vagina may be closed by want of development in the embryonal stage, or in consequence of inflammation ending in cohesion and artretism. Here, as in the case last spoken of, the menstrua are regularly poured into the womb and vagina, and retained until relieved by accident or by means of the surgeon's art. The same may be said as to the cases of imperforate hymen.

All these causes of emansio mensium are to be remembered in extraordinary examples of failure to menstruate at the proper age; and when the time arrives to make the needful inquiries, those inquiries should be made with the greatest care, in order to avoid mistakes in diagnosis.

Such are my views in general as to emansio mensium. But I do not intend to deny that some of the cases of it do depend upon a torpid, sluggish, or obtuse nature of the bleeding organ, the womb itself. It must, however, be always a very difficult task to verify such a diagnosis, except by means of experimental prescription.

If, upon scrupulous inquiries as to all the possible causes of the emansio hereinbefore described or alluded to, the Student should be left to the reasonable and indeed only remaining conclusion, that the fault rests with such a torpid and insensible uterus, then he might well attempt to excite within it a more active, vigorous life, by means of the stimulating articles that are called emmenagogues. Let him provoke a frequent, moderate tenesmus, by means of aloetics and gum-resins of various kinds; let him stimulate the nerves of the pelvic region, both internal and external, by baths, fomentations, cataplasms, embrocations, sinapisms, dry cupping or blisters, used as the endermic part of the treatment, while, at the same time, he stimulates the internal nerves of the pelvic region with Dewees's vol. tinct. of guaiacum, compound tinct. of aloes and canella, elixir proprietatis, Lady Webster's pills, tincture of black hellebore, tinct. of cantharides, etc. etc. Forasmuch as all the above-named medicines and means do tend to increase the vital activity of parts about the pelvis, a reasonable probability exists that they may usefully coincide with general constitutional measures in arousing the dormant sensibilities of the womb, and placing them in just relation to the powers of the ovary in its acts of ovulation.

In my opinion, though the causes now enumerated are not rarely to be regarded as lying at the foundation of amenorrhœal affections, most of the examples are dependent, not on the womb, but upon a lessening or cessation of the force by which ovarian vesicles are evolved and matured. Patients suffering with chronical maladies, attended with protracted amenorrhœa, exhibit, in the ovarian stroma, no vestiges of the Graafian vesicles. I lately examined the ovaria of a girl who died after some eighteen months of severe chronical ailments, during which she did not menstruate. Those ailments had no primary connection at all with any state of the reproductive organs, yet, upon carefully examining the ovarian stroma of both the ovaries, it was found to be a compact, whitish tissue, very similar to that which we observe in women long past the change of life. No trace of the ovarian vesicle existed in either of them. It is generally so.

It was clear from the dissection that this lady could not possibly have menstruated, if the *doctrine* be true; and further, that, in case her health could have been restored as to her chronic malady, many days, weeks, or months must have elapsed before the ovarian stroma could have developed the vesicles, or matured and discharged them, so as to give rise to the sanguineous sign of the mensual act. It is useless to

ask, in this place, what powers are possessed by the meng
necessarily to restore the discharge in such cases of amenorrhœa.

Having in the earlier part of this chapter expressed the opi
that most of the cases of *amenorrhœa* ought to be regarded as results o
eral anæmia, or watery state of the blood, I feel disposed, before
close the subject, to lay before the Student some further views,
especially certain opinions on that subject, that appear to me likely
throw light upon this matter in the study of those strange disorders,
therefore proceed by calling his attention first to a few simple prop
itions.

Let him weigh them, and judge whether they appear to hi
be consistent with truth, or with a high degree of probability as
the truth, which it should be the object of all men to know.

These opinions, that I am now to utter again in this place, have been favorably received in certain quarters, though in others they have made such impressions as I expected them to make. But whether accepted or not, all that I desire in regard to them is that they may be received and spread abroad if they be true, while I hope they may be utterly confuted and rejected if they be untrue. Truth belongs not to man. Truth is God's; He is the sole source and fountain of truth. Any man who boasts, saying this is *my truth*, this is mine, is a fool and a braggart; since the utmost that man can do is to perceive and recognize truths which, themselves, are mere proclamations or acknowledgments of God's law and will as to physical and [illegible] things.

The first proposition that I shall here offer to the Student is this, viz.:—

The living body consists of fluids and solids—which might be otherwise expressed by saying that it consists of the tissues and the blood;

The blood contains all the materials out of which the tissues are to be constructed, so that it is true to say, with a celebrated physiologist, the blood is the fluid body, the body is the solidified or concreted blood!

The body is separated from the blood by a membrane or tissue which serves as its outward boundary, and prevents the blood from mixing with the whole mass of the tissues. So that, while the blood permeates all the tissues, it is confined within certain strict channels of the blood-vessels.

This boundary membrane is generally known as the *membrana [illegible]*, or common membrane of the vessels, and is the inner lining of all the arteries, veins, and sinuses of the living body.

might be regarded as a multilocular cyst or sac—the several arteries, veins, or capillaries representing each a separate *loculus* or cell of the general sac. This sac is the only living tissue with which the blood ever comes in contact.

As long as the blood remains in contact with, or in normal relation to this sac, it retains its health, its vigor, and crasis; because, as the blood exists only by its connection with and through its dependence upon the nervous mass, this membrane is the organ of induction into it of the nervous force, or life-force.

It is certain that, whenever the connection betwixt the blood and the living solids is destroyed, the blood perishes.

Whether we regard the blood-disks as cells or not, we cannot deny that they are living entities; but their life is rather epizootic than self-substantial, there being but one circumstance in which they can maintain their existence, and that is the one above mentioned, to wit: they cannot exist save in the presence of the membrana communis, since through that organ they receive their inducted life.

If that organ of induction be perfect, the corpuscles may become perfect: if the organ become imperfect, or if it lose its vitality, they fail or they die along with it.

From the foregoing, I deduce that the membrana communis is charged with the faculty, not only of restraining the course of the blood in the bounds of circulation, but that it contains within itself the power to make the blood, and is indeed the *blood-membrane*.

If it may be healthfully constituted; if it may enjoy in perfection its crasis and its powers; then it may also, under certain circumstances, be subject to modifications of both crasis and power that shall affect the state of the blood-corpuscles, and render them unhealthy, or imperfect; for, inasmuch as the membrana communis is occasionally affected with inflammation, with weakness, with contusions, wounds, and other disorders, and as it is capable of those vital processes that are called adhesions, inflammation, suppuration, etc., it is impossible to deny not only that it may be strong or weak, or healthy or unhealthy, according to circumstances, but that the crasis of the blood must depend upon the state of the blood-membrane.

I have been condemned for using in my writings a word which I derived from the illustrious Professor Burdach, who ought, it should seem, to be held sufficient authority for the introduction of a word into our medical terminology. The very persons who have railed at me for using Burdach's word have no hesitation daily to employ a similar one. Such, for example, as the words *endo-cardium* and *endo-carditis*, from or ενδον and καρδια, by which they mean to express the idea of the lining membrane of the heart, or an inflammation of that lining membrane.

For my own part, I cannot discover any unreasonableness in Burdach's suggestion of the term *endangium*, from ενδον and αγγειον, *inner-vessel*, to express the idea of the lining membrane of the aorta, of the cava, of a great artery, vein, or sinus, since the Greek word αγγειον, and the other Greek word *en* or *endon*, express an idea of the same membrane where it is called endocardium, but only as being not confined to the cavities of the heart alone.

To repeat, or to write the long sentences, membrana vasorum communis, or *membrane commune des vaisseaux sanguins*, or the lining membrane of the bloodvessel system, is a useless toil; wherefore, I shall beg the Student, hereafter, to allow me to speak of it by using M. Burdach's short and euphonious term, *endangium*.

So much I have thought it incumbent on me to say in my own defence; and now I come to the question, whether the endangium is, in fact, charged with the important offices I have supposed; and here I must invite the Student to judge for himself upon an examination of the facts, particularly the following facts, that will nowhere be denied.

A child, in its mother's womb, touches her only by its placenta, which consists of the vascular tufts into which the umbilical arteries are divided upon reaching their place of destination in the after-birth. The placenta takes out of its mother's blood the oxygen and plasma sanguinis required by the fœtus.

The child in utero takes nothing but plasma, which is water, with a certain protein, probably, under the form of dissolved albumen and salts. It takes no blood, but only plasma.

But the blood, out of which the whole body of the embryon is made and maintained in its status sanitatis! Whence comes this blood, this generator of the body?

I have neither purpose nor time to enter at length into an examination of the principles of the hæmatosis. Such an essay requires not a few pages, but a volume; but, without entering at large on the subject, I may, in hopes of explaining myself, state a few particulars for that end.

1. The blood is daily renewed by means of the alible matter digested in the stomach and bowels, and absorbed by the lacteal absorbents, by which it is transferred to the bloodvessels.

2. The whole of the blood is contained in the heart, the arteries, the capillaries, the erectile tissue, and the veins.

3. The only tissue that the blood touches is the endangium, which is the lining or interior membrane of all bloodvessels. In the viscera

—in all the organs, indeed—it is probable that the ultimate ramuscule of a vessel consists solely of endangium, the stronger coats being unnecessary in the last distribution. The endangium, to use the idea of Prof. Burdach, separates the blood from the body, as the scarf-skin separates the body from the external world. The endangium is the delimitary membrane of the blood. The blood perishes, or changes very soon, almost immediately, after it escapes from within the endangium. It is converted—or it is coagulated, or it dissolves, or it ceases to be blood, upon leaving the cavity of the endangium.

4. Notwithstanding the chyle—particularly chyle taken from the upper end of the thoracic duct—contains vesicles or globules, or corpuscles that are of a reddish hue, and that are the results of the earliest morphological operations of the hæmatosis, it is not proper to regard these corpuscles as blood.

5. Soon after the chyle is poured into the cavity of the endangium, and becomes exposed to the influences of the oxygen in the lungs, it acquires the character of perfect blood. The fœtus in utero touches the parent only by the placental tufts that it has developed at the extremity of its umbilical artery. It is only by these placental tufts that it can receive from the parent the material supplies for its hæmatosis. This material enters into its sanguiferous system only, since it comes into the vena cava by the umbilical vein. If the child has a power to make its own blood, it is clear that it makes it within the walls of its endangium. There is no other *solid* that the alible material of the child can come in contact with. Therefore, either the blood makes itself, or the endangium of the embryo makes it.

6. It is, therefore, not to oxygen alone that it is indebted for its morphological developments.

7. Contact with the endangium is essential to that development, since the blood loses its physical character as soon as it ceases from that contact. The endangium contains the force that makes the blood. This proposition, which I put forth in my *Letters to the Class*, has been denied. I reiterate it here; and I ask what violence is done to probability in this doctrine, seeing it is universally admitted that the power of a cell—a far more simple and elementary body—is so great that it can, out of the alible cytoblastem in which it exists, produce, by its metabolic and plastic energy, cartilage, ligament, skin, muscle, aciniferous viscera, nerve, and, indeed, all solids of the body? If the το μηταβωλικον και το πλαστικον really appertain to the simple tissues of cells, may we not concede a higher power to the elementary structure which we call endangium ?. The cell-power is a

power of presence and contact, not a power of percolation or endosmose or exosmose merely.

8. The endangium is the blood-membrane. When it is healthy, the blood is so—when it is diseased, the blood becomes diseased. The health of the endangium is as essential to a normal hæmatosis as that of the gastro-intestinal mucous membrane is to the health of the digestive force. In diseases of the endocardium, the functions of the heart are modified, but the endocardium is the endangium of the heart. Similar affections of the endangium, ranging throughout extensive portions of the sanguiferous system, derange the bloodvessels in which they occur, and the whole mass of the blood.

9. Simple diminution in the life-force of the endangium produces the idiopathic forms of anæmia, in which the solid constituents of the blood become lessened in quantity, while the aqueous constituent increases in quantity.

10. One thousand grains of healthy blood ought to contain seven hundred and ninety grains of water. In hydræmia, a thousand grains may contain eight hundred and fifty grains of water—or even more. Such a state of the blood is hydræmia.

11. Plethora is a contrary state, one in which the watery proportion is lessened, and the solid constituents augmented.

12. The endangium is the regulator of these proportions; when its powers are either lessened or exaggerated the crasis is changed.

13. The nervous mass, acted on by oxygen, gives out the nerve-force, the biotic force, the life-force. It does not extricate or give out that force under any other exciter or influence.

14. The arterial blood conveys oxygen, which it imparts to the nervous mass. Oken scarcely speaks metaphorically when he declares that an artery is an air-tube; it conveys vital air, oxygen. Perfect blood conveys the due amount of oxygen required to develop a perfect innervative force. Imperfect blood cannot convey a due amount of oxygen—whence the innervations produced by it are inevitably imperfect.

15. The health, activity, and power of all the organs, are but the exact expression of their innervation; under circumstances of imperfect blood in the endangium, their health, activity, and power become deranged.

In these propositions, I have set forth the opinions I have long held as to the influence of states of the endangium upon the health. I am, perhaps, imprudent, again to put them forth in this manner, and without the array and support of many facts and many arguments that I deem confirmatory of them. I prefer, however, to submit them to the reader in all their nakedness, rather than not to present them for his examination. I hope that, in any event, they may serve me to elucidate the rationale I am about to state, as to the amenorrhœal affections, which are still under consideration.

I have said that reproductive force is complemental, and that menstruation is a sign of the active state of that force.

The blood of an anæmical girl is incapable of developing her innervative force in sufficient amount for the regular operation of the ordinary functions. She will, therefore, scarcely produce nervous force sufficient to execute both the special and the complemental offices of her life.

The amenorrhœal girl is generally anæmical. To cure her anæmia, is to re-establish the dominion of her life-power over both the special, and the complemental powers and offices of the system.

No attempt should be made to bring on menstruation, in order to the cure of the anæmia; but, *mutatis mutandis*, the anæmia should be cured, in order that her blood, fully and thoroughly oxygeniferous, may enable her nervous mass to extricate the biotic force in sum equal to the demands of the general, as well as the special, or complemental wants of the economy.

The curative indications for such ends consist in the use of drugs, frictions, baths, exercise, dress, diet, and medicines, as well as the psychiatric recommendations that may be apposite for the cases.

Drugs.—Aperients are, for the most part, indispensable, and they may well consist of a basis of aloes, or other resinous cathartics, in combination with rhubarb or extract of colocynth, and, on proper occasions, of mercury.

The celebrated Hooper's pill, which is familiarly known by every mother in the land, is composed chiefly of aloes.

The Dinner-pill, or Lady Webster's pill, is also aperient, on account of the aloes combined with it.

In some of the samples of amenorrhœa, which, while they chiefly depend upon a want of vigor in the blood, may derive a part of their rebelliousness from unhealthy states of the circulation and innervations of the pelvic viscera, a useful resource is to be found in the compound powder of jalap. Doses, consisting of twenty grains of jalap, forty grains of cream of tartar, and six drops of oil of anise-seed, may be given every alternate morning, with considerable advantage. I have sometimes directed my patients to procure half a dozen packages, each containing such a dose, and to use one of them every other day, until the whole of them should be taken.

When the idea is entertained that the hepatic secretions are impaired, under a vicious state of the portal circulation, a very proper alterative will be obtained by the exhibition of six grains of blue-pill, fifteen grains of extract of taraxacum, and ten grains of soda, suspended with a drachm of gum Arabic, in an ounce of distilled mint or cinnamon-water. Such a dose should be followed by an aperient dose of magnesia, oil, senna, or salts.

Tonics.—The most available tonic is iron.

Iron appears to possess a peculiar power to modify the rate of the hæmatosis. Certainly, one might in vain endeavor to remove certain cases of anæmia by the aid of quinine, the various vegetable tonics, and the mineral tonics, with the same rapidity and completeness as with the ferruginous medicines. I believe that common experience teaches the truth of the above proposition.

I know not what is the rationale of the almost specific power of the martial preparations in anæmical disorders, yet I am willing to believe it true that the iron enters into direct combination with the blood, to render it more powerful and more noble by its union with it, and that it acts as a direct tonic for the solids of the economy, imparting a greater energy to the cell-life of the blood-corpuscles. Mr. Quésneville teaches us that it does combine with the blood-disks, and absorbs the oxygen which it gives out to the tissues, and that the blood takes up more or less oxygen in proportion as it contains more or less iron. I think nothing is better or more clearly established in my mind, as a therapeutical maxim, than this, namely, that an anæmical girl, who labors under no other malady, is cured of her anæmia in about sixteen days, by the proper use of iron.

The use of iron was well known so far back as the days of Louise Bourgeois, who, in her *Observations diverses sur la Stérilité, perte de fruict*, etc. etc. (Paris, 1627, 12 v. p. 23), says: "*Pour en avoir l'heureuse yssue, il en faut user trois sepmaines, ou un mois; mais sans aucun doubte toutes les incommodités causées par le mal, cesseront avant quinze jours;*" that is to say, in order to reap the benefit of the medicine, it ought to be employed for three weeks, or a month; but, beyond all doubt, the whole of the inconveniences arising from the disorder will be at an end in a fortnight. Now, Louise, who speaks so positively on this point, was unacquainted with our beautiful preparation, iron-by-hydrogen, and used one which, though not so good as ours, was yet capable of producing such remarkable effects as she points out.

As Louise was a celebrated practitioner, and indeed in all respects a sensible and excellent woman, I shall indulge my desire to translate the passage in which she describes her famous medicine; thinking also that, perhaps, some American practitioner might wish to subject her remedy to the test of experiment. She says: "We should take then a quantity of iron-filings, any quantity, and put it into a crucible, such as goldsmiths use, which being placed among hot coals, the fire should be kept up until the crucible becomes as red-hot as the coals; when thus heated, let the heat be kept up for about a quarter of an hour, then take it off, and it will be quite black. It is next to be pulverized in a mortar until it is as fine as possible. To four drachms of this powder, add four drachms of cinnamon, sifted very fine: mix them well, and then take four ounces of sugar, and mix with it a little water; boil it into a syrup, and make it clear of scum. Then, little by little, add the powder, and stir it all the time until the process is finished. To test this, put a drop now and then on the edge of a plate, to see if it is sufficiently candied. As soon as it has become sufficiently done, pour the whole out upon a sheet of paper, and then work or beat it with a spatula, and make it into lozenges of convenient size."

There are a great many martial preparations.

Vallet's mass, which is the same article as the pil. ferri carb. of the *U. S. Pharmacopœia*, is a very serviceable thing, and the purple precipitated carbonate of iron is also one of great power, but not unapt to prove irritating to the stomach, especially in the extravagant doses commonly allowed—as a teaspoonful twice or thrice a day. The pills of Dr. Blaud, of Caux, have also acquired a great celebrity for their emmenagogue power. They consist of carbonate of iron, combined with sulphate of potash.

Now, as, in the exhibition of ferruginous medicines, it is understood that the iron is the therapeutical agent on which reliance is placed, there seems to me little advantage in exhibiting it in combination with any particular acid, since it is to be supposed that such combinations are immediately dissolved and new relations established with the metallic base, in the stomach. Hence, I greatly prefer to administer the article in its metallic form; and, thanks to the ingenuity of Messrs. Quêvenne and Miquelard, Pharmaciens of La Pitié Hospital, at Paris, we are favored with an impalpable powder of iron, that is prompt to enter into chemical union with the acids of the digestive canal.

This beautiful agent, which is produced by passing a current of hydrogen over peroxide of iron heated to redness in a porcelain tube, is a microscopic powder of iron—the hydrogen, united with the oxygen of the peroxide to form water, having left the iron pure and uncombined. It is prepared at Paris by M. Debreiul, the successor of Messrs. Pellétier and Caventou, and sold by the importers and apothecaries in this country.

My own custom is to exhibit it in the form of pills weighing two grains, and I habitually direct the patient to take one of the pills very soon after each daily meal. If swallowed while the stomach is engaged in the act of digestion, it does not occasion any unpleasant sensation; and it is present and in readiness for any salifying acid that happens to appear during the chymification of the food.

It is both inodorous and tasteless, and may be used without danger during an indefinite series of days, or weeks, or months.

No doubt rests upon my mind that it is the most powerful, safest, and least disagreeable tonic drug that the therapeutist can prescribe for the amenorrhoeas depending upon a principle of anæmia—the most ordinary principle of those maladies. I ought to add that my attention was attracted to it by M. Raciborski's work *sur la Ponte Périodique*, and that it is to him I am first indebted for the practical advantages I have received from this medicine, and which induced me to take measures to introduce it into the practice in this country. The consumption of the article is already become very great, and will, without any doubt, become much greater—so as to supersede the other martial medicines.

In addition to the doses of iron used as above, it is necessary for the patient to observe certain rules as to the action of the bowels, which cannot be expected, under the imperfect and irregular extrication of biotic force of the anæmical girl, to be exact and orderly as in persons in health.

Medicines, of which the basis is aloes, are particularly adapted to such cases. The elixir proprietatis; the pill of aloes and rhubarb; the pill called Lady Webster's or English dinner-pill; the tinctura sacra, and a variety of such formulas, afford the opportunity for selecting preparations that may seem best suited to the existing indications.

Acescent food is the cause of much digestive distress. The acescent vegetables and fruits ought, therefore, to be eschewed, and, indeed, a considerable proportion of the food should be taken from the animal kingdom. Brown meats and game are preferable. A roast chicken, or roast beef or mutton, is preferable to other kinds of market provision, and it is, when practicable, useful to cause the patient to take a portion of meat at breakfast and tea, as well as at dinner.

Hot drinks, as coffee, tea, and chocolate, or cocoa, are debilitating to the already feeble powers of the stomach. When such articles ought not to be allowed, the patient can take claret and water, with meat and bread, and butter and eggs for the breakfast, often with signal advantage. But the wine should be pure and unadulterated with brandy, which is so commonly added to every cask of claret sent to the United States for sale. Good Bordeaux wine, *non frêlaté*, that is, not brandied, makes an admirable substitute for boiling tea, coffee, and chocolate, which, though they may not sensibly injure persons in strong health, are yet surely unsuitable to the feeble and attenuated female. The claret should be sufficiently diluted. I think that a wineglassful and a half of claret, in a common tumbler of water, is not too strong a mixture even for a delicate girl.

There is no health without exercise and light. The patient should be much in the open air, exposed to solar light, when not too intense. She should reinforce the powers of the circulation by means of exercise. The best exercise is active, not passive exercise. But I dare not devote these pages to an extended discussion of this subject. I have, in my seventh and twenty-seventh *Letters to the Class*, pretty clearly stated my views on the topic, and refer the Student to those Letters.

CHAPTER VIII.

PREGNANCY.

Pregnancy.—The subject of pregnancy is one that is worthy of the most careful study by those who intend to devote themselves to the pursuits of Obstetricy, and, indeed, it merits the attention of all persons desirous to become acquainted with those miraculous powers and actions of the living body that result in forming and perfecting a human being, the crowning-work of the Deity in creation, who ordains man thus to come forth from the darkness of nonentity, in order that he may live to shine upon the stage of the world, and there act his part in the great drama of the living world.

There have appeared a great many speculations and theories upon the subject of Generation; yet, however ingenious or inventive their authors, or however eloquent or argumentative in urging the adoption of their peculiar views, there still remains a *terra incognita* of Embryogeny, which human sagacity, perseverance, and toil have never been able to explore; and which seems purposely set beyond the reach of the utmost ken of human wisdom or learning.

It must ever, we should think, remain impossible for man to comprehend the secret mysteries of those proximate causes, by the force of which a non-existent, or formless being is drawn forth of the dark sources of time, and launched out on the boundless ocean of eternity; made partaker of a prospective immortality; charged with the burden of responsibilities to God and his fellow-creatures; and bound by numerous relations to the physical world, of which he has also become a part by the very fact of his entrance into a moral state. Such a subject, nevertheless, cannot fail to prove interesting to the Medical Student, whether he approaches it in view of its physiological connections, or whether he wishes to investigate it as a psychological inquiry of the utmost importance in any system of moral philosophy. What subject, indeed, could be more replete with interest than one which pretends or seeks to explain all the changes that are experienced by the embryo, from its first discoverable estate as a drop of pellucid lymph, or as maculæ germinativæ, up to the time when it comes forth into the world endowed with all the powers that are appropriate to a healthy, full-grown fœtus at term! Such a study involves a comparison of its organs with those of all other living creatures as well as those of the adult animal, and a complete history of their development and growth; and it ought also to comprise an account of the accidents and diseases to which it is liable, with a full detail of all the peculiarities of the ovum and its several parts, and a comparison of them with the several parts in various animals. The subject comprises, therefore, a vast field of physiology, which might be profitably explored by the curious Student; but the limits of this work are too confined to admit of it being treated of at length on this occasion.

If, as it has been eloquently said, the springing up of a blade of grass from the bosom of the earth is calculated to fill the mind with wonder and amazement, what far more vivid impressions of the miraculous power of God are likely to be made upon those who contemplate the unfolding of those organs and faculties, by means of which man learns not only to know and acknowledge his Maker, but to render himself, as it were, a still more fitting image of Him, by the education of the faculties that have justly given him the title of the lord of creation! In addition to the interest as a merely philosophical study with which our subject is clothed, it appears to me indispensable that the Medical Student should make himself acquainted with it, as taught in past times, as well as at the present era, and that he should aim to obtain a thorough knowledge of the subject, knowledge which can alone fit him for the conduct of cases in midwifery. But, let him consider whether in aiming at this so-called practical knowledge, he is not also called upon to make himself master of all those scholarly acquirements which can shed a light of revelation upon the dark and doubtful questions that in his practice he must not only solve, but instantly solve. To know that a pregnant woman has a child in the womb, and to learn by rote something of the presentations, positions, and manœuvres relative to the midwifery operation, is but a vulgar knowledge, common to old women and to physicians who confine themselves to the study of text-books and the unrecorded and misunderstood experience of their own clinical operations. The Student ought to study the subject not merely as a midwifery qualification, but as an Obstetric Science, the possession of which places him in the fore front of his professional rank.

Pregnancy is the developing of an embryo or fœtus in the womb.

An account of pregnancy comprises a relation of all the changes that take place in the reproductive organs and in the whole economy of the female, from conception, to the end of the puerperal state, as well as a history of the development of the fœtus. It is proper, however, for convenience sake, to separate the account of pregnancy and embryogeny from that of parturition, which in itself presents a great and imposing subject of study.

Inasmuch as there are, besides natural or healthful pregnancies, cases to be met with of morbid or preternatural pregnancies, the latter merit a proper share of consideration. Hence, we ought to inquire not only into the physiological, but into the pathological conditions that are brought about by pregnancy, and learn the seat, nature, causes, signs, and cure of many troublesome disorders and dangerous accidents that overtake the gravid woman.

Fecundation.—In order that a woman may become pregnant, it is necessary that a germ, matured in one of the ovaries, should be expelled from its Graafian follicle, and then fecundated by the encounter of it with the male sexual element, the sperm or seed. I have already shown that the germ is contained within an ovum or egg; which the woman, like all other reproductive animals, matures and spontaneously discharges at regular periods.

I shall by no means pretend to show what is the nature of the mutual influences of the seed and the ovum, or which it is of the two that in this generative encounter furnishes the nucleole of the new entity about to start on the career of development. These are mysteries beyond human ken, and likely ever so to remain. It is in the mean time unquestionable that the concurrence of two different systems of genital organs is indispensable; that one of them must be female, ovaric, or germiferous, and the other male, yielding spermzoons and a fluid with peculiar properties. Neither the female nor male is endowed with the independent power of reproduction. It is usually admitted that the female yields the germ, and the male a material which, upon some combination or contact with the germ, imparts to it the power to grow or augment at a certain rate, and only in given and rigorously predetermined forms. The ovulum discharged from the maternal ovary, though alive, is not generically alive; it cannot evolve either form or substance beyond its present stage; it is as yet unfecundated; fecundation renders it at once capable of generical evolution. To fecundate is, therefore, to impart generic force. Is this induction the act of the male alone, or of both male and female? Perhaps it is better to regard the ovulum as a cell, and the seed as the product of a cell; for the seed is originally a cell whose rupture or disintegration sets at liberty the fascicles of spermzoons that are produced within them. In this view, both the female and the male furnish each a reproductive cell.

Without desiring to call in question this opinion as to the germiferous nature of the female, an opinion which I cannot but adopt, I may avail myself of the occasion to advert to the opinion set forth by M. Schleiden, that the developing matter of the embryo plant—its primordial solid—is contributed by the male organ of the vegetable. Mr. S. shows that the pollen tube is a series of cells propagated from the pollen grain; that the pollen tube shoots its terminal cell into the ovary of the plant; and that a pollen-cell, making use of the cytoblastema within the ovary, the medium in which it is now placed, begins the career of the new vegetable, plant, or tree.

In this view, the terminal cell of the pollen tube is the germ, and the anther which yields the pollen grain is a female, not a male organ; for that which produces the germ is female. But even if M. Schleiden is correct in his views, the dogma is not overthrown; naturalists have only mistaken the sexual characters of plants, calling those female that are male, and *vice versâ*.

At the present day, it is not doubted that the woman produces the germ by the force of her ovarian stroma; yet it is not long since it was contended that a zoosperm, or spermatic animalcule conveyed to the surface of the ovary, and entering in at a pore, finds a nidus or matrix therein, for its early morphological operations, being thus the starting-point of the embryogenic processes.

No doubt exists as to the cell-nature of the ovulum of the mammals, and there is some reason to believe in the cell-nature even of the spermzoon. If they be equally cells, which hath the pre-eminence, or which is the true germ? and where is the philosopher that can, with absolute assurance, declare which of these cells is the primal solid in the generic or fecundative processes? I freely acknowledge my own ignorance of the essential nature of fecundation. Fecundation is not conception; a woman may have within her organs a fecundated ovulum, without having conceived.

Conception.—A fecundated ovulum entering into the womb through the Fallopian tube, and falling without delay into the vagina, may be destroyed or lost before conception can take place: it may be washed away in a torrent of blood, or carried off amidst a quantity of mucus. In such case, the woman has been fecundated, but she has failed to conceive.

An ovum may suffer the encounter with the male element even in the infundibulum or fimbria of the tube, and falling out into the cavity of the pelvis or belly, be wholly lost, from not making its attachment to the serous surface on which it has fallen. It could not attach itself to a serous membrane, for its nature renders it indispensable that its basement should be a mucous membrane.

Conception is the fixation of a fecundated ovum upon the living surface of the mother; it is the formation of an attachment to or union with the womb, the tube, &c., of the mother. This is conception, viz. the fixation of a fecundated ovum. If conception take place in the womb, it is pregnancy; if out of the womb, it is extra-uterine pregnancy; in the Fallopian tube, tubal pregnancy; in the ovarium, ovaric pregnancy; if it occur in the substance of the wall of the womb, it is called interstitial pregnancy.

Commencement of pregnancy.—Pregnancy ordinarily begins soon after a periodical menstruation.

Several days probably always elapse betwixt the act of fecundation and that of conception. The ovum, in the mean time, by means of endosmose, is augmenting in volume, and undergoing important changes in the arrangement and mixt of its constituent elements, changes that are requisite to fit it for the higher act of forming its attachment to the mother, which is conception.

It is not precisely known how many days ordinarily elapse between the end of the process of ovulation and fecundation and that of conception. M. Velpeau seems to entertain doubts as to the four ova he describes at page 25 of his *Embryologie*, and which were from eight to twelve days old. It is not known how long they had been in the womb before their expulsion. Probably, Sir Everard Home's specimen, described in the *Lond. Phil. Trans.*, was an embryo of seven days.

The facts seem to concur in proving that shortly after the act of fecundation the conception takes place; but it is probable that the time is various.

As menstruation coincides with the periodical act of ovulation, and as the sexual embrace is attended with the orgasm whether gravidity follows it or not, there is great reason to suppose that the coitus of the sexes is frequently followed by fecundation of ova, that are subsequently lost by effluxion, and it is to the last degree improbable that every fecundated ovum shall be able to effect its mesenteric attachment or fixation.

Fecundation and conception can take place only after the dehiscence and discharge of the Graafian follicle, whose ovulum, but for the aphrodisiac orgasm, would necessarily be lost; for, unless the orgasm should occur, the fimbria of the Fallopian tube cannot be placed upon the ovary; the tube lies flaccid in the pelvis except when erected by the orgasm.

Amidst the doubt and uncertainty that rest upon the subject, it must be regarded as scarcely possible to ascertain a fixed term. Hippocrates and Galen, and most medical men, as well as most women, since them, believe that the sooner the sexual congress follows after the menstruation, the more liable is the woman to conceive. It was, if this notion be true, a singular policy of the Jewish legislator, that pronounced such deadly reprobation upon all violators of the law of women's cleanness; and it seems to me a subject of surprise that the daughters of Abraham should, to this day, obey a custom calculated to obviate the greatest possible productiveness of their nation. The number of the Jews, at the date of the expatriation under the reign of Vespasian and Titus, was about 5,000,000 souls. There is reason to think that it has remained nearly stationary since the overthrow of their city by Titus. If the curious law of cleanness of women should be abrogated as to the Jewish wives, would the augmented chances of fecundation cause the sons of Abraham to become as the stars of the firmament, and the sands on the sea-shore for number? Is it the operation of this ancient law that has kept the population of the Jewish people down, through so many centuries, to one even tenor of about 5,000,000 souls?

I shall now present a curious document received from a gentleman[*] here, who was so obliging as to keep for me a careful record of the menstrual periods, the coitus, and the dates of birth—as in the annexed table.—It throws some light upon this subject.

June 6th, 1845.—Menstrual discharge ceased.
7th, Married—æt. 20 years, 5 months.
Mar. 11th, 1846.—Daughter born = 277 days from June 7th to March 11th.
June 1st, 1847.—Abortion, at end of 1st month.
Aug. 18th, Menstrua appeared.
23d, " ceased.
24th, Coitus, coitus.
Sept. 21st, " "
22d, Appearance of menstrua—only a slight stain.
May 30th, 1848.—Daughter born = 268 days from August 23d to May 30th, child premature.
Aug. 6th, Menstrua.
11th, " ceased.
29th, Coitus—first.

Sept.	6th,	Menstrua.
	12th,	" ceased.
	25th,	First coitus.
Feb.	14th, 1849.—	Quickening.
July	26th,	Son born = 282 days from September 12th to July 21st.

This record shows that one child was born in 277, another in 268, and the third in 282 days after the disappearance of the monthly discharge.

It is possible that ovulation may in some women shortly precede, while in the majority it absolutely coincides in point of time with, the first appearances of the hemorrhage, and no man has a right to say that the monthly hyperæmia may not sluggishly arise even one or more days after the escape has actually taken place, in some rare instances. As to the impression still entertained by some reputable authors, that the discharge of the ovule depends upon the aphrodisiac orgasm, it is too unreasonable an hypothesis; too unreasonable, I say, because, the dehiscence being the effect of absorptive power, and not of a lacerative or vulnerative force, it is idle to attribute to a momentary orgasm, which perhaps has no positive influence on the circulation within the ovaries, a result that requires for its effectuation many days of the slow action of the absorbents of the ovarium. The regularity of the ovulative paroxysm is as great in the virgin as in the married woman; and is equally regular, moreover, in the vegetable as in the animal kingdom. It is much to be desired that careful observations of the state of the ovaries in persons dying just before, pending, or soon after the close of the monthly flow, should be laid before the profession in order that more accurate notions may be had upon the subject, and those gentlemen who should happen to enjoy opportunities of the kind, would deserve the thanks of their brethren for every such item of information accurately presented through the medical press.

As to the precise place at which the encounter of the sexual elements takes place, we do know that it may, and sometimes does occur in the Fallopian tube; indeed, we have certain proofs of this in all the cases of tubal pregnancy, which are but too numerous in the records of Medicine.

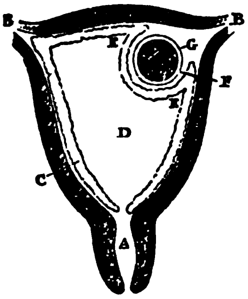
The examples of ventral or abdominal pregnancy ought not to be taken as proof of an encounter of the male and female elements within the peritoneal sac.

As to ovarian pregnancies, I cannot deem them possible, except under the following circumstances. Both Bischoff and Martin Barry have found the zoosperm upon the surface of the ovary in animals killed immediately post coitû; this is sufficient proof that the prolific semen had been transported by the tube or cornu to the fimbria, whose embrace of the ovarium had deposited the zoosperms upon the ovarian indusium. If we suppose this transfer to be effected at the moment of the appearance, in the opened hila, of a mature ovule, it is clear the generative encounter would here take place, and the act of fecundation become complete. Upon some change of posture of the woman the further escape of the fecundated ovule might be now prevented, the pore being stopped by the pressure of a fold of broad ligament, a loop of intestine, or other obstructing cause; and thus the fecundated germ, imprisoned within its cell, might there commence its career of development, making of the ancient follicle, which produced it, its matrix or succedaneous womb up to the time at which it must inevitably burst. I am compelled to adopt this hypothesis; for I can by no means conceive that fecundation of a germ contained within an unopened Graafian follicle can possibly take place, as I fully adopt and believe Mr. Pouchet's doctrine as to the spontaneous discharge of the ovulum previously to the fecundation. I cannot believe that the male seed could enter into the ovisac, through not the peritoneum only, but through the albuginea and the concentric coasts of the ovisac.

Decidua.—The womb is provided with a lining or coat, called the decidua or caduca. This caduca has been regarded as a membrane excreted by the uterus as a means of securing the product of the conception, by affording to it a nidus in which to imbibe the earliest elements or pabulum for its development.

For a long time past it has been generally supposed that the womb, coincidently with the fecundative act, throws out a viscous excretion from its inner walls, so as to line or plaster the whole surface with the viscid matter. The cut, Fig. 48, is designed to show the manner in which this is supposed to occur. The dark, thick outlines represent the womb, already somewhat expanded by the growing ovum. A is the canal of the neck of the womb. B is the orifice of the left Fallopian tube, whose fellow is seen at B the opposite angle. C is the decidua or caduca excreted by the inner surface of the womb, covering it as with a soft induitus. D is the vacant cavity of the uterus. E the

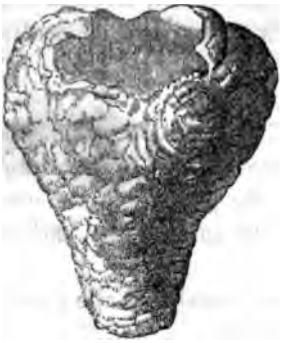
Fig. 48.



same decidua or caduca, pushed off from the surface by the globule of the ovum G, which, as it increases in size, thrusts the decidua, or reflects it, as in the outlines, from E to E. It is this part to which the name of decidua reflexa, or caduca reflexa, has been given. F indicates the chorion or outer membrane of the ovum.

It often happens that women miscarry in the early stages of their pregnancy, and where the event occurs in the most favorable manner, the entire product of the gestation is thrust forth in an unbroken or perfect state. When this occurs, we find, upon examination, an oviform or pyriform body, upon the upper segment of which is seen a mass of tufted chorion, while the remainder consists of a dense and rather solid fleshy material, which is the original or true decidua, called decidua vera. By careful manipulation, it is possible to extract from the upper part of this mass the complete and perfect ovum, consisting of the chorion, with its remaining tufts, inside of which chorion is the amnion, the water of the amnios, and the embryo.

Fig. 49.



A good notion of the appearance of the whole decidua after the extraction of the ovum, which has been taken out of the hole at the top of it, may be got by examining the pear-shaped Fig. 49 annexed. The pit or depression at the upper end, out of which the ovum was taken, is the reflected decidua, while the outer or pear-shaped object represents the decidua vera, which filled the whole womb, and was moulded by its cavity. It is clear that if the ovum should continue to grow, and to reflect the decidua, or carry it before it, the decidua reflexa would at last come in contact with the inside of the decidua vera, be pressed against it, and that they would weld or solder together, so as at length to make it impossible to separate, or even distinguish them from each other.

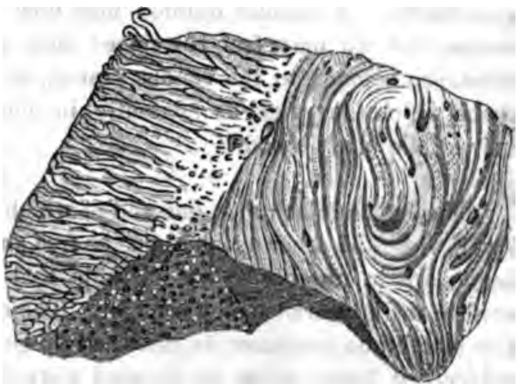
The cavity of the decidua vera, which at first was a closed sac, was, according to Breschet, filled originally with a fluid. Breschet gave to this liquor the denomination of hydro-perione; of course, such hydro-perione must be removed in the process of reflection and ultimate fusion of the decidua reflexa and decidua vera. We shall find, further on, other opinions on this subject.

Such are the Hunterian views of the decidua; *videl.*, it is an excretion from the womb to answer a temporary purpose, after the effectuation of which it falls away, and is discharged. Other explanations of this product have been lately presented, which are, perhaps, more worthy of acceptance.

Many persons have heretofore disputed the existence of a mucous lining in the interior of the womb, contending that the corpus mucosum terminates within the os tincæ, and that the inner wall of the womb is peculiar, but not mucous. I presume no anatomist can be found at the present day to deny the existence of a mucous body of some sort as composing the tissue of the inner paries of the organ.

M. Coste's Atlas, already cited, contains several beautiful engravings, representing magnified views of this texture, and among them one which exhibits the appearance of a piece cut from the substance of the womb, on which is seen the inner lining membrane. I regret that it was not possible for me to give copies of those drawings. Mr. Gibon, however, has been very successful in copying the one annexed, which represents a magnified piece cut from the uterus.

Fig. 50.



The right hand portion of the picture represents the fibrous structure of the substance of the womb, while the left and under sides show the appearance, greatly magnified, of the lining membrane, which consists of tubes perpendicular to the surface. The orifices of these tubes, cut off by the section, are seen at the inferior margin of the drawing.

I translate from page 208 of M. Coste's *Histoire Gén. et Part. du Dév. des Corps organ.*, the following portion of an article, which cannot but prove interesting to the reader of this work:—

"Upon examining the bodies of young girls dying suddenly, at the approach of a first menstrual period, or those of adult women who have perished by suicide while menstruating, I have found that among the Graafian vesicles of the ovaries there is always one of them decidedly more advanced than the rest. At the same time, the mucous body of the womb, phlogosed and of a turgescent appearance, in obedience to the laws of a pre-established harmony, is modified as it is in the mammifers during the season of the rut, and prepared for the reception of the ovule, whose spontaneous maturation is about to occasion its fall.

"While, indeed, the ovarian capsule that is about to burst becomes the seat of this rapid evolution, the vascular apparatus of the womb is coincidently developed and injected in an extraordinary manner; that of the mucous membrane especially, forms at the surface of the membrane, beneath the delicate layer of epithelium with which it is invested, an elegant network with irregularly lozenge-shaped meshes, each of which incloses the orifice of one of the innumerable glandular tubes of which it almost wholly consists. This vascular reticulation is so decided and so rich that in certain subjects it communicates to the inner surface of the womb a more or less violet hue. In all probability, it is through these delicate ramuscules, of which the network consists, that the menstrual blood oozes. In cases where a pregnancy has become somewhat advanced, and the ovum, lodged upon the mucous surface, has affected the mucous tissue so as to cause it to assume all the characteristic features of the caduca, these ramuscules become so greatly developed that many of them attain the size of a quill-barrel. A definite opinion may now be obtained of their real nature, and we may feel convinced that the major portion of this substance belongs to the venous system, so that the mensual hemorrhage which they yield is evidently, in chief, derived from the reservoir of the black blood."

* * * * * * *

"These glandular tubes, one end of which is related to the muscular layer, while the other opens upon the free surface of the mucous membrane, are in number so considerable, that their orifices give to the surface the appearance of a strainer. Their presence in the tissue of the membrane increases its thickness to such a degree that, in many subjects, it forms plicæ, or elevated convolutions, that are soft, compressed, and so jammed together, as to leave no void space in the cavity of the womb. These convolutions, when the ovum descends from the tube, seize it, and retain it by their contact or pressure. Upon inspecting the extraordinary thickness of this membrane, one might be led to suppose it the seat of a true pathological hypertrophy, or other alteration, were it not that repeated experience, corroborated by the examination of the parts, in women dying of accidents at the commencement of pregnancy, afford us the undeniable proofs of its being a normal condition of things."

M. Coste's engravings give very beautiful illustrations of the assertions of the above paragraph, and I have the pleasure to bear witness to the fidelity of at least one of his pictures, of which he presented me with an engraved and colored copy, while I was in Paris, in 1845. Not only was that engraving a most faithful copy of the water-color drawing, but M. Coste had the kindness to show me the anatomical specimen from which the drawing was made. It is impossible for art to give a more perfect representation of an object. These views of the nature of the decidua seem to meet the concurrence of the author of an excellent work on midwifery, now in process of publication in Germany: I allude to *Die Geburtskunde, &c.*, by Franz A. Kiwisch Ritter von Rotterau: *Erlangen*, 1851. This author regards the *decidua vera* as a hypertrophy of the tubular tissue described by Goodsir and others, with modifications affecting the epithelium of the womb. The drawing in Coste's Atlas gives a clear idea of his notion as to the manner in which the ovulum, once imbedded betwixt two folds of the hypertrophied membrane, clothes itself with a decidua reflexa.

I beg to remark that, however strongly I am led to adopt M. Coste's explanation, I feel some difficulty in accepting it, because I cannot readily comprehend how, after all this tubular structure is once thrown off as a decidua, it can ever be reproduced for the service of subsequent pregnancies. This tubular tissue must be regarded as an organ, complete in all its essential elements, and if it is in fact wholly deciduous and lost with each labor or abortion, then it presents an example of a complete organ, reproduced in the most elevated of the mammals; a thing which is, I believe, without analogy in the higher series of warm-blooded animals.

In the course of the researches that I made in the years 1847–8, upon the reproduction of the Opossum, I had occasion to examine the uteri of many of those animals, both in the gravid and non-gravid state. I present to the reader an outline drawing of the uro-genital apparatus of that singular animal, which is a monotreme. In figure 51, *a* is the urinary bladder; *b b*, the first wombs; *c c*, the secondary wombs; *d d*, the ovaria; *e*, the uro-genital sinus, along the surface of which (*e*) lies the rectum. The sinus uro-genitalis and the rectum unite in a cloaca, or monotrematous sac, which, as in the birds, gives outlet to the products of digestion, urination, and conception.

I examined this animal on the 3d of April, 1847, and found seven marsupial embryons in the pouch, which, from their size, I have reason to suppose must have come into the marsupium about the 10th of March, as they compare with my specimens of the 7th of March.

This figure represents the bladder, wombs, and sinus, inflated by the blowpipe. The wombs *b b*, when the animal is in rut, become twice or nearly thrice as large as they are in the figure; and the increased magnitude depends solely upon the development of the mucous tubuli,

COOPER MEDICAL COLL
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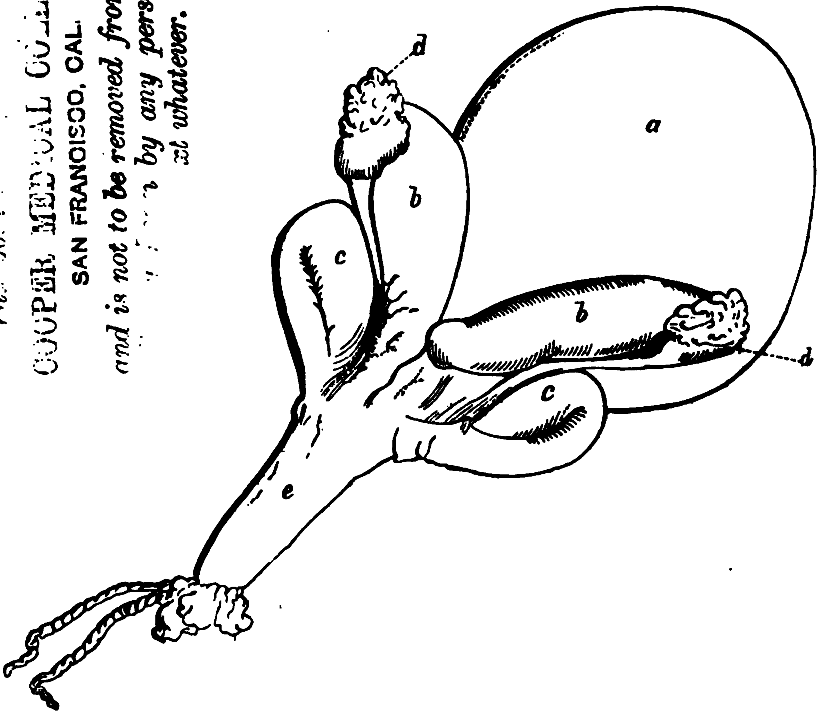
and is not to be removed from the
by any person or
whatever.

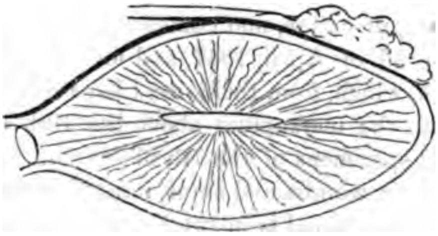
Fig. 51.



of which M. Coste speaks in the above quotation. The cavity is very minute—bean-shaped, and filled with an apparently slimy matter as in Fig. 52.

In an opossum examined last winter, there being present Drs. J. Wallace and E. Wallace, the aorta was injected with size colored with vermilion. Much of the injection was found to be effused into the small bean-shaped cavity of the wombs *b b*; but there was a great multitude of tubuli standing vertically to the paries of the womb, that were filled with the red injection, presenting the appearance of waving, or straight red lines, that passed from the inner superficies of the substance of the womb down through the soft deciduous matter to the inner boundary of it. The Fig. 52, gives a pretty correct view of the appearances presented upon cutting

Fig. 52.



one of the wombs open in its longitudinal diameter. The lenticular-shaped cavity is seen in it as well as the converging tubuli. It gives also a good idea of the thickness of the membranous uterine walls, compared with the accidentally developed interior muco-tubular membrane. On the exterior of the womb is seen the ovary, with part of its Fallopian tube. I think no one who has examined M. Coste's engraving of the gravid womb, opened, can fail to be struck with the immense comparative development of these uterine tubuli during the rut in the opossum. It was, probably, among the slimes of this tubular texture that the Rev. Dr. Bachman, of Charleston, S. C., found the young embryons moving—as expressed in his paper to the Philad. Acad. of Natural Sciences, 1848. I in vain searched for such free embryos in the various specimens of Didelphis in rut that I examined with the Drs. Wallace.

There is one circumstance that ought not to be overlooked by the Student while making up his settled opinion as to the decidua. It is this. In the solidungula, the pachydermata, and the cetacea, the entire exterior surface of the chorion becomes placenta; for the placental tufts are processes from the exterior surface of the chorion. In all these animals, while it is impossible to conceive of a decidua reflexa, it is equally difficult to admit of a Hunterian vera to which the whole exterior surface of the chorion could affix itself. Ought not the Student, then, to pause and consider whether this great and very general fact in embryogeny does not afford one of the strongest sanctions of M. Coste's views of the original organic nature of the decidua? The means by which ends are produced, in nature, are always few; and as the uterine products in all the other mammals are formed without the intervention of a Hunterian decidua, it seems on that account probable it could not be indispensable in human embryogeny.

I leave it to the Student therefore to judge for himself, as to the nature of the deciduous coat of the womb; and to decide betwixt the Hunterian explanation of it already given, and the new doctrine, of which he has here the sufficient elements for the end of making up his opinion.

The ovum, after reaching the uterine cavity, grows rapidly. At first, it must be supposed to augment by endosmose, which conveys to its interior the cytoblastema found in mucous fluids amidst which it exists within the womb. Gradually developing its substance by means of changes by segmentation of the yelk, and also, probably, by means of the pabulum it finds in the mucus by which it is surrounded, it soon commences the acts of evolution of its parts. This process is effected by sending forth to all its parts, by means of the ventricles of the heart, the sanguine materials which it first creates and then converts.

As the foundations of the tissues are being built up in these histological deposits, the nervous mass is everywhere deposited among them, and as in fact their most essential element. This nervous mass, in the form of nervous molecules, fibrils, and cords, is, like all the rest of the solids, derived from the blood; for nothing is truer than Oken's assertion, that "the blood is the fluid body, and the body the fixed and rigid blood"—so that the whole of the developments of the embryo and fœtus come to be at last the results of organic deposits, derived from its blood alone.

The embryo requires an engine for the circulation of its own blood. Hence the features of the heart must be early disclosed—the path of the aorta is laid out by the blood itself; and the courses of the omphalo-mesenteric vessels are traced in order that the functions of the umbilical vesicle may not too soon fail.

The aorta, as it grows longer, divides into two branches, which are not two primitive iliacs, but two umbilical arteries, designed to send the blood of the embryo to circulate near the mother's blood, and to take from her the quantity of oxygen requisite for its aëration, and also a certain plasma which it brings back to the body of the embryo. These two umbilical arteries after some time give off branches which at length become sufficiently large to be easily demonstrated as external iliacs, femorals, popliteals, &c., the vessels of the limb, which are productions from the umbilicals, at last assuming their permanent character as iliacs, femorals, popliteals, &c. The blood of the embryo, by the extension of its umbilical vessels, comes at length to circulate among the cellular mass that is developed on the outer surface of the chorion, amidst which it receives its supplies of oxygen and also its alible elements. So that it is true to say, along with Professor Owen, that a placenta is a fleshy and vascular process from the exterior surface of the chorion.

When the embryo becomes at last developed within its amnion, chorion, decidua reflexa, and decidua uterina, it cannot be considered, of itself, to have any contact with the maternal surfaces—nor has it any other connection with the mother, save by its vessels and blood alone, which it sends forth far beyond the limits of its own body, into the distal tufts of the branches of its umbilical vessels, to spread it upon the living wall of its mother's tissues, there to receive its endowment of oxygen.

The only part of the child that really touches the mother is the blood of the child.

The embryonal blood, having traversed the capillary system of the placental tufts, returns by the channels of the umbilical veins. All the umbilical venules and capillaries have, probably, the power of taking up, by endosmose or absorption, some species of plasma or cytoblastema, from the maternal surfaces. They convey this, together with the aërated blood of the umbilical capillaries, into the single tube of the umbilical vein, which delivers it over to the child, by pouring it partly into the hepatic porta, and partly into the inferior cava by way of the ductus venosus, which is the continued tube of the umbilical vein. Professor Liebig's Researches on the Motion of the Juices in the Animal Body may be one's sufficient warrant to believe that the placenta can take up from the maternal tissues an amount of organic material adequate to the development of the uterine embryo and fœtus by endosmose.

While the embryo is growing, the amnios continues to fill with larger and still larger quantities of water, the placenta increases in size, and the womb, which affords a nidus for the tender young, augments *pari passû* with the ovum and its contents.

The womb yields to the antagonistie force of the expanding ovum. It undergoes a compulsory hypertrophic development. The womb always resists this expanding power; it makes daily and perhaps hourly efforts to cast forth the burden from its cavity. It is not stretched, but compelled to grow.

The ovum commences its career of development not in the neck, but in the cavity of the womb, which is composed of the wall of the fundus and corpus uteri.

The long cylindrical cervix is not at first interested in the struggle or contest between the expanding ovum and the resisting cavity. It stands as the guardian of the fruit of the conception. The cervix uteri is the seat of what the ancients called the *facultas retentrix*, and it continues superior in force to the *facultas expultrix* until the close of pregnancy, when, being finally exhausted, the facultas expultrix acquires sole dominion, and labor commences. If at any time, during the course of a pregnancy, the retentive power of the cervix should fail, the expulsive power of the fundus and corpus uteri immediately begins to expel the ovum.

Many of the abortions that we meet with are caused by this weakness of the womb—that is to say, by weakness of the cervix uteri, which gradually yields to the antagonizing contraction of the body and fundus, and allows the ovum to come forth and be lost. The physician makes use of this principle in the treatment of cases in which the indication is plain to bring on premature labor. He dilates the canal of the cervix with his finger or with a sponge tent or a colpeurynter, and he takes away the facultas retentrix, and the ovum comes off.

It is curious to observe the care and providence with which the retentive faculty is fortified in certain of the tribes of creatures. In the cetacea, for example, there is a double cervix, a double os uteri, one within the other, so that one of them being dilated may leave the other still undilated and capable of resisting the antagonism of the fundus until the last moment of uterine gestation is accomplished. (*See* a paper on the Reproductive Organs of Delphinus nesarnak, in the *Transactions* of the Acad. of Nat. Sciences of Philad., with engravings, by Ch. D. Meigs.)

While the uterus is thus the reluctant servant of the forces of the ovum, it gradually increases in weight and volume, as well as in the cubic content of its cavity. After labor, it weighs a pound and a half; in the non-gravid state, it weighs two ounces and a half. It follows, therefore, that, in the course of a gestation, a vast increment of its mass takes place, and that this whole sum consists in living organic molecules, whether fluid or solid, that are deposited within its limits and become constituents of them.

I shall not endeavor to give the rationale of the influence exercised upon the womb by the growing ovum. Perhaps John Hunter would ascribe it to the stimulus of distension. Suffice it for me to say, that at any time in the course of the whole career, that career may, by the physician, be instantly arrested and brought to a speedy close, by destroying or withdrawing the ovum, or by overcoming the retentive power of the cervix uteri. To discharge the waters of the amnios by puncture, to dilate the canal of the cervix with a sponge-tent, or to energize immoderately the facultas expultrix of the fundus and corpus uteri by means of ergot, is to arrest and bring to a close the whole operations of the reproductive processes.

As the womb grows larger, its arteries and veins become elongated, and their tubes become more considerable in size and weight. The nerves are enlarged, or, at least, they are extended or *produced*. The absorbents, in like manner, are augmented, and, more than all, the great masses of muscular tissue existing in the virgin womb *in potentiâ* rather than in reality, acquire a visible and palpable magnitude and a great force.

As the womb expands, forced outwards in every dimension from its centre, its walls do not diminish in thickness, although they become softer and more succulent. Torrents of blood circulate in the tortuous branches of the uterine arteries, and soak along in the immense sinuses and veins, some of which are large enough freely to admit a finger within their cavities.

In the development of the superficial veins of the gravid womb, the fibrous coats of them do not appear to undergo much change or addition. It is the lining membrane, the endangium, that is to say, the vein that runs in the substance of the organ that is chiefly increased, so that, in examining the gravid womb, one sees rather great holes and channels lined with a smooth endangium, running among the tissue, than ordinary veins. In this respect there is nothing peculiar to the womb, since it has been long known that the veins within a viscus consist only of the endangium, as must indeed have been the case in the earliest stages of development, even of the aorta itself, for the blood makes its own channel. It makes, therefore, its endangium first, and the more tough, fibrous, and elastic parts of its tubes afterwards. (*See* Raciborski's paper on the Veins, in the *Transactions* of the Roy. Acad. Medicine.)

From the foregoing, it appears that the augmentation in weight, volume, and capacity of the gravid womb, is a compulsory process under an antagonistic force applied and sustained by the self-developing ovum. The ovum may be compared to a powerful acephalocyst that, attaching itself by means of its placental mass, that serves as a suctorial organ, to the living wall of the womb, absorbs, and compels it to yield in every dimension for its growing wants of accommodation. I beg the Student to see, in this great change of the womb from its non-gravid weight of two ounces to its gravid weight at term of one pound, or even one pound and a half, the proof of what I said a little while ago, *videl.*, that the uterus is subject to a physiological hypertrophic evolution, from which it recovers as soon as the cause is removed; for, when the womb becomes emptied by the act of parturition, it returns within thirty or forty days to its non-gravid weight and size. The Student, in this, will see an example of an enormous hypertrophy or evolution, produced in the course of two hundred and eighty days, and recovered from by involution in the course of one month after the termination of the pregnancy. Let him reflect, therefore, that, if this is the law of the womb, it ought not to surprise him to learn that irritations, displacements, and various other causes may excite in the vacant womb this same disposition to hypertrophy under which it grows rapidly larger and larger for a certain time, but ceases to grow and returns speedily to its normal size and weight very soon after the irritation, displacement, &c., are removed.

Though the womb increases in weight as pregnancy proceeds, the means of its suspension in the cavity of the pelvis are still the same in the gravid as in the non-gravid state. It is to be expected, then, that, as the uterus becomes heavier, it shall sink somewhat lower down, and that the woman shall, if she be a susceptible creature, perceive some symptoms like those of a falling of the womb: although the womb is growing larger, the lower part of the abdomen does not, at first, become larger. On the contrary, the early sinking downwards of the womb causes the hypogastrium to be less protuberant than before the conception, and hence the French proverb: "*A ventre plât, enfant il y a*;" or, as an old English midwifery states it,

> "In a belly that is flat
> There's a child, be sure of that."

These signs of falling of the womb in women who are married, should be ever held as suspicious until there is full reason to believe that they are not results of an early pregnancy; and there is frequently no little embarrassment in coming to a positive conclusion; even the vaginal taxis cannot, in all instances, give an assured ground of opinion, since the engorgements of the uterus, so frequently coincident with prolapsions, are with difficulty to be distinguished from the augmented volume of the same organ arising from gravidity.

The reproductive organs have a direct connection with the cerebro-spinal, and the ganglionic system of innervations. There is, therefore, no part nor parcel of the economy, into relation with which it cannot, under certain states of health, be brought; they are among the most powerful disturbers of the complacency of the organisms. They constitute an imperium in imperio, whose behests are not to be disobeyed. These organs can disturb the brain—the respiration—the digestion—the circulation—the secretions—the nutrition.

When the womb has become the seat of an advancing gestation, and feels the impulse of development, the complacency of the other innervations is, generally, discomposed. The stomach is one of the organs earliest to be called into sympathetic distress. The sympathy of the stomach is, in general, independent of any marked change of the animal heat, and of the rate of the arterial pulse. It is expressed by anorexia, by nausea, and ofttimes by vomiting. Probably the salivation, which is also a common symptom in pregnancy, is one of the same category of disturbances, as is also the sore-mouth of pregnant and suckling women.

Multitudes of women suffer from nausea only in the morning hours; the sympathy being interrupted by the business, the preoccupation, and the fatigues of the day, to return again on the following morning and follow the same course. In some, the nausea is perpetual, and attended with the most obstinate vomiting.

In most of the cases the nausea is gone before the quickening takes place; yet a young woman, under my care, vomited very soon after the conception, and vomited every day, and many times daily, during the whole course of her pregnancy. When her labor came on, which was a hard one, her disposition to vomit was greatly aggravated with every renewal of the contractions. To such a height did this symptom rise, that I found it seriously to contravene the intent and purpose of the labor pains. It is not a good practice, in general, to rupture the membranes of a primipara; but in this instance I concluded that, if the ovum could be allowed to discharge the waters, the condensation of the womb, that would follow, might put an end to the vomiting. I thrust my index finger through the distended bag of waters at the next pain. From that moment the nine-month's vomiting ceased, and returned no more. The labor, no longer delayed and contravened by the troublesome vomiting, hastened to a favorable conclusion.

I attended a lady in Spruce Street, a few years since, who, during nearly three consecutive months, appeared to vomit up every particle of her ingesta. It was her own opinion, coincided in by her friends and attendants, that the total amount of all her food and drinks returned very soon after they were swallowed. Although she felt much weakened, I could not perceive that, under this process, she lost her flesh; and, in the end, she gave birth to a healthy daughter. It is apparent that she must have been nourished during this time; but the manner, and the quantity, have remained ever since a mystery that I cannot explain. I cite this as one case only out of a great number that have occurred in my practice.

Many of these troubles vanish while the woman takes exercise in her carriage or on foot; because, as before said, the powers of the constitution, when devoted to the purposes supposed in every case of active employment of them, are not liable to be checked and diverted by a morbid consent of the stomach with the womb. Hence such women should be advised to walk or ride, or to busy themselves with their affairs, and avoid a sedentary and slothful life.

The acidity and eructations, and the diarrhœa or costiveness of pregnancy, may be obviated by the use of alkalies, whether soda or potash, magnesia, lime, or ammonia. Some vigor may be communicated to the gastric innervations by means of champagne; or by brandy and water, rum and water, or by certain of the bitter spirituous tinctures, combined with aperients.

I readily cured a case of this sort, in the spring of 1848, in a person who had suffered great distress from vomiting, cardialgia, flatulency, and constipation. She had a mixture composed of sweet tincture of rhubarb two ounces, and tincture of gentian one ounce. A dessert-spoonful of this medicine, taken once a day, dissipated all the symptoms; and I assure the Student that, in many instances of severe distress from this vomiting, I have found the patients promptly relieved by its use. Two drops of tincture of aconite, in a tablespoonful of water, may be given for the dose, in certain of the cases, with marked relief.

Many of those examples that consist of nausea and vomiting during the early part of the day, but which cease after the meridian hour, may be set aside by the following method:—

Let a cup of coffee, with a toast, be brought to the bedside at the earliest morning hour. The patient should be called from her sleep to take this preliminary breakfast, without rising from bed. As soon as it is taken, let her lie down to sleep again, if possible. It appears useless to offer a rationale of this method. I am very confident, however, that, in a considerable number of persons, it will be found to put a sudden stop to the vomiting, as well as to the nausea. Certainly, many of my patients have been speedily, as well as permanently cured by it, and that in very distressing instances of the nausea.

Inasmuch as pregnancy enables the womb to disturb the alimentary organs in the manner above mentioned, it might reasonably be inferred that the rest of the nervous mass is also liable to interruption of its regular action, from similar causes. Considerable modifications are sometimes observable even in the temper and disposition of the woman. Those who are by nature amiable and gentle, sometimes becomes peevish, and fretted by trifles—full of false alarms and idle fears; while persons naturally ill-tempered become charitable, and kind, and courageous. Strange desires, longings, wishes for extraordinary, unprocurable, or disgusting kinds of aliment, are said to arise in pregnant women; but in a long clinical practice I have never met with any examples of the sort; which leads me to infer that these longings are more frequent in the books than in the practice of our art.

Quickening.—The embryo acquires a power of slight muscular motion at an early stage of pregnancy; but, as it is inclosed within the decidua and the membranes, and floats in an abundant liquor amnii, the first feeble motions of its body or limbs cannot make themselves felt through so many coverings, by the living tissue of the womb. In general, it attains the age of four months and a half before it becomes sufficiently large and strong to make itself felt by the mother when thrusting with its feet or hands, or when suddenly redressing its body from the usually flexed position. When the child hath first acquired this power to make its motion felt by the mother, it is said to be quick with life, or to have quickened, and the event is called the quickening. Quickening is the first perceived motion of the child.

The lawyers have looked upon a child quick with life as worthy of the protection of the laws; for it is felony, maliciously and with evil intent, to kill a child that is quick with life in the womb, but not felony to kill one that is not quick with life. It appears to me that this is a distinction without a difference; for the child of six weeks, or of two months, is as essentially quick with life as one of five or seven, or even nine months. The only difference is, that the child at four or four and a half months is strong enough to make itself felt, while at two or two and a half months its movements are so feeble as not to be perceptible by the mother. It is to be hoped that this barbarous and ignorant distinction, a remnant of early superstition, may be done away with by our modern legislatures, and that the wretches who for hire lend our art to the detestable baseness *teneros avellere fœtus* may be made liable to condign punishment for the crime, committed at whatever stage of the gestation.

Form of the Belly in Pregnancy.—As the ovum grows larger day by day, so doth the womb continue to expand, adding molecule to molecule, weight to weight, and mass to mass. The lower belly becomes a little protuberant, and the swelling is fashioned upon the pear-shaped womb that lies beneath, and pushes the belly outwards. The Student should remember that other bodies besides the womb may cause the abdomen to enlarge, but that no object save the uterus itself can give to the hypogaster its peculiar gravid shape. The form of the hypogastric tumor dependent on the state of gravidity furnishes to the physician, therefore, a very useful means of diagnosis, which ought not to be neglected in some of the difficult cases, cases in which it is a matter of extreme consequence to individuals that no mistake should be made as to the real nature of the symptoms.

Pouting of the Navel.—The navel in the non-gravid woman is a deep depression or dimple. This depression is caused by the contraction or shortening of the remainders of the two umbilical arteries and veins, which, after birth, draw the skin inwards and downwards to make the pit of the navel. In the gravid woman, when the six months are past, the navel rises to the general level of the skin, and, as the womb grows larger in its progress, the umbilicus protrudes, because the ligamentous remainders of the umbilical vessels, which are deployed with the mass of the abdomen, can no longer draw it inwards. A pouting of the navel is, therefore, one of the consequences and signs of a pregnancy of six and more than six months' duration. Other tumors in the belly may make the navel to pout.

Cramps from Pregnancy.—Sometimes the gravid womb fills up by its bulk the cavity of the pelvis, so as to produce cramps in the legs by pressing too firmly upon and obstructing the sacral and obturator nerves. There is no remedy but patience and time.

Costiveness in Pregnancy.—When the womb has got fairly up into the cavity of the abdomen, it lies in front of the convolutions of the intestines; even the transverse colon lies rather behind the upper part of the fundus, so that when, in a gravid subject, the abdomen is laid open, nothing is to be seen but the uterus in front. The edge of the right lobe of the liver, or a segment of the greater curvature of the stomach, the omentum, and colon lie upon the top, and towards the reverse of the fundus uteri.

In this situation, it is impossible for the bowels to receive, in the same manner and degree, the stimulating and natural succussions of the abdominal muscles, as they receive them under ordinary circumstances. Those succussions are constant provocatives to a healthful activity of the peristaltic force, and are essential thereto. The failure of them tends to render the peristaltic motion languid or torpid, and therefore costiveness is a very ordinary state in advanced pregnancy. Let the Student reflect upon the evil effects of such torpor, in overloading the alimentary tube with the undischarged residuum of the digestions, by which the tension of the abdomen is increased, and the mesenteric and hepatic circulations and innervations brought into disorder, and which ought to be corrected by the proper remedies.

Alternate Hardening and Relaxation of the Womb.—As the womb approaches nearer to its term of gestation, the retentive faculty grows gradually less, from the deploying of the upper part of the cervix, which becomes a part of the general cavity for the accommodation of the ovum. The expulsive faculty makes frequent efforts to overcome the remaining antagonism of the cervix. These efforts, which doubtless lend a chief aid in the act of deploying the cervix uteri, are to be detected in the alternate hardening and softening of the globe of the uterus under one's hand placed upon the abdomen. If the hand be placed upon the abdomen of a pregnant woman, it may be that the impression will first be received of a great softness and pliability of the textures, but, upon keeping the palm *in situ*, the tumor begins to grow harder and harder, until a very condensed condition of the organ is produced by this tonic contraction of its muscular tissue.

These contractions are not productive of the least pain or any disagreeable sensation, save a feeling which women designate as a "drawing" sensation. One feels surprised, sometimes, upon observing the very positive force of these contractions, to hear the woman say that they produce no pain in the back or hypogastrium; particularly as the same degree of hardening or contraction of the organ in a labor is accompanied with very decided pain. The reason of the difference is this—viz., the pains of labor are pains of the yielding but still resisting os and cervix; while these contractions, above described, do not cause any positive stretching and pain of either of those parts.

How the Cylindrical Neck becomes Conical.—These contractions are repeated very often during many weeks, and, indeed, it may be said they are reiterated throughout the whole duration of the pregnancy. The effect of them is gradually to reduce the cylindrical neck of the womb to the shape of a cone—or rather to the form of the lesser pole of an egg, and to make the os tincæ acquire a circular instead of its usual oblong or oval form, and to convert it into a dimple or pit in the apex of the now oviform uterus. When this dimple has become completely developed by the resolution of the cylindrical into the conoidal cervix, labor is ready to begin, and the next repetition of the contraction might justly be accounted as the first pain of the labor, for the labor pain is nothing else than contraction of the organ, by which the expulsive faculty strives to overcome the retentive faculty, and thus free the uterus of its contents, by thrusting them forth into the vagina, and thence into the world.

Size of the Gravid Womb at Term.—The uterus, rising upwards in the cavity of the belly, finally attains the length of full twelve inches. I measured the gravid uterus at term, in an individual who died suddenly before the onset of labor, during the month of June, 1848. It was twelve inches long, and eight inches in transverse diameter. The broad ligaments rise, of course, as the womb rises; and the ligamenta rotunda, which extend from the internal abdominal rings to the angles of the uterus, ought not, in a normal state, to be more than two and a half to three inches in length; yet by the mounting upwards of the uterus towards the scrobiculus cordis, they acquire a length of five or six inches at least, serving to stay or steady the womb as it goes up, and, on occasions, to render it oblique to the right or left, in proportion as the right or left ligamentum rotundum is the readiest or the most reluctant to yield as the rising womb compels it to accompany the ascent. I call the attention of the Student to this condition of these ligaments, now, in order that he may in this connection clearly understand that, if the round ligaments should not diminish their own longitude *pari passû* with the lessening of that of the womb after labor, and if they should continue elongated, or weak and relaxed, after the womb has returned nearly to its non-gravid dimensions, then the womb, having no support to prevent it from falling backwards, will be liable to dip its fundus below the promontorium, and be overset backwards, or retroverted. Whenever this accident happens, it is attributable to a fault of both the round and the utero-sacral ligaments; since, with round ligaments two and a half inches in length, the fundus could not possibly retreat far enough from the symphysis pubis to admit of the state of retroversion. Let the Student early learn that one of the common accidents of the lying-in state is this very accident, the non-contraction of the ligamenta uterina—and let him carefully estimate the effects, as to pelvic obstruction, pain, bearing down and general disturbance of the health, likely to arise from such an accident. While he is ignorant of these simple facts in pathology, he will permit his patients to suffer needlessly; but, well informed on this point, he will surely obviate by his precautions such sore distress. The accident is by no means an uncommon one after abortion at the third or fourth month. In such instances, and always, indeed, when the woman makes complaint of backache and pain within the pelvis, with tenesmus of the rectum or bladder, or both; and when she keeps her bed instead of getting up at the usual period and completely recovering as she might be expected to do a few days after the miscarriage, let the Student be careful to make a full exploration of the case. It is highly probable that all these complaints will be found to depend entirely on a retroverted state of the womb that has taken place because the ligaments could not contract soon enough and solidly enough to keep the organ in its proper position.

The Placenta.—A placenta is a vascular flesh excrescence from the exterior surface of the chorion, and is formed not before, but some time subsequently to the assumption by the embryo of its earliest form. Being produced solely by the chorion which belongs to the ovum, it has nothing to do with the womb except to attach itself to it as a base on which it is to grow. At first it is probably a mere microscopic point situated upon a similar point in the uterus; it enlarges daily and exactly in the same ratio as the womb enlarges. It does not overgrow its base, nor does the base on which it rests overgrow it—they must augment at an equal rate.

In the primary stages of connection betwixt the ovum and the womb, the tufts of the chorion, which are merely masses of cells attached together as clubs or cylinders, do probably sink into the orifices of the tubular glands of the uterine mucous membrane, and derive from the secretions by their endosmotic power some cytoblastema that is appropriated to the earlier processes of development of the fecundated ovum. In the mean time, those curious acts called the segmentation of the yelk go on until the faint traces of the embryo come at last to be made manifest. The heart is a cylindrical tube that expands and contracts by turns, driving forwards into the soft and diffluent materials a drop of blood, which flows back again in the diastole. Little by little the quantity of blood increases, and is jetted further and further from the fountain of the circulation, making the track it is to follow, which gradually acquires the characteristics of a bloodvessel. Each renewed jet drives the vessel further and further from the heart, and the omphalo-mesenteric vessels and the aorta are gradually formed. The aorta reaches the point of its bifurcation, and one branch becomes the right and the other one the left umbilical artery. These two vessels attached to the growing allantois extend with the expansion of that organ, and at length reach the inner wall of the chorion, through which they make their way, to be divided on the external wall of the same chorion into myriads of capillaries and venules and arterioles that convey the blood which is driven into their tubes by every systole of the embryonal heart. These bloodvessels on the outer surface of the chorion lie in contact with the inner lining wall of the womb, carry their blood close along on its surface, and when they by the reunion of many capillaries have acquired the nature of veins, they serve as channels of return through which the placental blood is conveyed back into the body of the embryo.

Thus it appears that when the embryonic heart contracts it propels the blood through the aorta, the umbilical arteries, the placental capillaries and small veins into the great umbilical vein, and so, back into the heart from whence it was driven by the systole. In this circulation it has not at all mixed with the blood circulating in the vessels of the womb, nor has it acquired any blood, as such, from the parent. Yet it has absorbed, as it passed along her living surface, a portion of her oxygen. It has also imbibed by endosmosis portions of plasma, or liquor sanguinis, which it is transporting to the interior of the embryo, in order that the said plasma may be by the power of the embryo or fœtus converted into fœtal blood. This plasma, or liquor sanguinis, is water containing dissolved albumen and salts that are susceptible of passing, by exosmose, out of the mother's vascular tubes, and by endosmose into the interior of the fœtal vessels. It contains the elements of blood, to be elaborated within the economy of the embryo or fœtus.

The Student now perceives that I would inculcate the opinion that the placenta only sits on the womb as a basis to rest on and as a living surface out of which to take oxygen and liquor sanguinis—that there is no inosculation of maternal with fœtal bloodvessels, and that the placenta is wholly and solely a product of the living ovum, with which the womb has no part nor lot, except to afford a point to rest on and a feeding ground from which to procure the alible materials of the ovum.

The nature of the connection thus formed is the subject of great differences of opinion, that have not been settled even by the authority of John Hunter, who first proposed a rational explanation of this difficult point, in his article on the placenta, which may be consulted in his volume of papers on the Animal Economy. According to Mr. Hunter, the placenta is a symmetrical organ, consisting of two parts, one derived from the womb and the other from the child.

Seiler, in his work *Die Gebaärmutter, und das Ei des Menschen*, stoutly denies that the placenta belongs to the mother; and Velpeau, in his *Ovologie ou Embryologie humaine*, p. 65, says: "Et j'ose affirmer avec plus d'assurance que jamais que le placenta humain est entièrement fœtal." I declare, with greater confidence than ever, that the human placenta is entirely fœtal.

While the celebrated Velpeau thus resolutely rejects the Hunterian doctrine that there is a uterine portion of the placenta, other very eminent persons equally insist that an important portion of the mass is actually derived from the womb; and that, whenever it is extruded by the contractions of the organ, not only is the fœtal portion expelled, but the whole of the uterine portion also, which is detached at the same time, comes off with the fœtal half; from which, indeed, there is afterwards no possibility of separating it, nor even of distinguishing them, the one from the other.

Prof. Owen, of London, is one of the distinguished naturalists who contend that the placenta is constituted of materials, part of which belong to the mother and part to the ovum. Mr. Owen says, after having carefully compared the Hunterian preparations with the results of his own examinations of the gravid uterus at full period: "I now believe they all fully bear out Mr. Hunter's general view, viz: that the maternal blood is diffused, by means of the tortuous arteries, into the spongy cellular substance of the placenta, where it bathes the capillaries of the fœtal circulation, and is returned by the oblique decidual adventitious sinuses and channels into the orifices of the uterine veins." (*Vide* Note in *Hunter on the Animal Economy*, p. 102.)

M. Flourens, Professor of Comparative Physiology at the Jardin des Plantes, says, in his *Cours sur la Génération*, p. 130, that the umbilical vessels of the mammifers, which everywhere pierce the chorion, in order to come at the internal surface of the womb, are called placentas. The placenta is an inherent characteristic of viviparous production. It cannot, therefore, exist in the oviparæ. Mr. F. divides the mammals into two great classes, one of which comprises man, the rodentia, and the carnivora; while in the other class are arranged the pachydermata, the solipedes, and the ruminantia. In the first class, he contends, there is a vascular inosculation of the mother's vessels with those of the ovum, whereas no trace of such vascular union can be detected in the second.

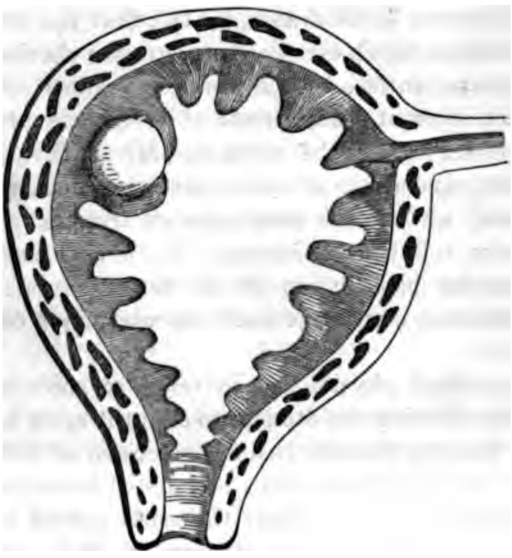
I have cited this distinguished physiologist in order to show his opinion; but I am far from advising the Student to adopt it upon his authority. His assertion that the placenta is a characteristic of viviparous production, is denied by high authority; and notwithstanding I am prompted to agree with him, I admit that the most careful research has never enabled me to discover the least trace of a placenta or cord in the early marsupial embryon, as I have stated in my paper on the Didelphis, in *Amer. Phil. Trans.*

Mr. Owen's assertion, in regard to these differences in the classes, is as follows: "Thus the placental intercommunication between the fœtus and mother, in the human subject and quadrumana, is carried on by the contact of the fœtal capillaries with maternal extravasated blood; while in the ruminants, the mare and the sow, it takes place by the apposition of capillaries to capillaries, and the two parts of the placenta, viz: fœtal and maternal, can be separated. In the ferræ and rodentia, there appears to be an intermediate structure." (*Loc. cit.*)

Let the Student, while pondering on these propositions of Masters in our science observe that, though the separation of the placenta in child-birth is essentially hemorrhagic, and never so in the parturition of quadrupeds, which might lead to inferences in favor of different plans of union, yet organs of such vital importance in the economy of the genera are not likely to be modelled upon plans absolutely different in creatures so nearly allied in their great types. In all the mammifers, there is one type for the brain and nerves, one for the respiration, one for the circulation, one for the absorption, secretions, reproduction, &c., and there should, *à fortiori*, be but one for the great and indispensable branchio-absorptive apparatus of the fœtus.

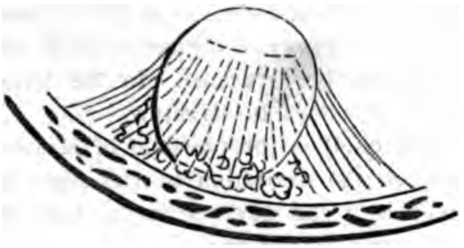
I have already said that being in Paris in the year 1845, I enjoyed an opportunity to examine some of Professor Coste's preparations of the gravid womb, as well as the water-color drawings, and engravings of them, and I now repeat that the engravings are most faithful representations of the facts exhibited to me.

Fig. 53.



Let us suppose Mr. Coste's views as to the real nature of what is called the decidua to be absolutely correct, and let us consider the annexed Fig. 53 as a representation of a gravid womb cut through transversely from top to bottom, and containing an early ovum imbedded in one of the plicæ or sulci of the tubular membrane, then the ovulum, partly buried in one of the sulci of the plicated membrane, will sit on the basement tissue, which is the womb itself. If an ovulum should be thus caught, fixed and half buried between the rugæ, it might form its mesenteric attachment at the bottom of the fold, and, daily increasing in size, it might cause its decidua reflexa to grow thinner, until it should, at last, wholly disappear, as in Fig. 54. The segment of the ovum that looks inwards to the cavity of the uterus, pierces through the thin coating of decidua, as in the figure annexed, and I have seen such an example.

Fig. 54.



As some of our brethren appear to take interest in the researches and opinions of Dr. Ernest Henry Weber, of the University of Leipsic, it is proper for me to show the grounds on which that author rests his theory. He directs that a gravid womb having been opened by an incision should be carefully washed, and then laid in alcohol to become somewhat hardened by the spirit. When sufficiently firm, an orifice of one of the veins opened in the uterine substance by the cut, should be sought, and the vessel inflated by means of a blowpipe. The inflated vein is then to be slit up with the scissors, and its track followed by successively inflating it and slitting it up. In this way the course of the vein is followed into the substance of the placenta, a certain portion of which is found to have been distended with the air of the blowpipe, which escapes from openings in accidentally broken vessels. The walls of these veins are so thin as to evidently consist only of the thinnest polished inner membrane. In this way, by dissecting and inflating, canals are discovered that are not really veins, but a sort of vacuoles and passages betwixt the spongioles of the fœtal part of the placenta. Occasionally one finds a vein in which the spongioles or tufts are pressed against the side of the vein, so that the inner wall or tube of the vessel is roughened by the intrusion; but it is to be understood that the tuft does not enter into the vein itself through an aperture in its wall: it only drives the thin vein-wall before it, reflects it, and so, covers itself with a coating of this vein-wall.

Weber supposes that these umbilical tufts that thus thrust the vein-walls before them, are arches or loops of vessels which in this manner carry their flowing blood as it were into the very heart of the vein without mixing the fluids however; the current in the large vein being protected by its indented vessel, and that in the umbilical one being confined to its own tube, so that the poor, half oxygenated blood of the embryon flows onwards in its own channel, which is surrounded with the hot rich fluid of its mother.

Such is Dr. Weber's idea; a very pretty and pleasing one—which, however, I cannot adopt, because I can never believe that the mother has any lot or part in the confectioning of the placenta, and which, moreover, is not called for by any absolute necessity of the case, seeing that vast whales, horses, oxen, and other great animals are as readily developed in gestation as man is, without any such complex apparatus. There is one law of gravitation, and I as fully believe, there is but one law of connection betwixt the embryon and its mammiferous parent.

In the human placenta, and in those of certain quadrupeds, all the placental tufts are united into a single disk, cake, or placenta, as in the adjoining Fig. 55, which shows the uterine surface, where the lobules of the placenta are seen divided by the lines of the septa. These lobules are very numerous: and if, instead of being assembled in one disk, they were disseminated over various parts of the womb, the analogy to the ruminant organ would be complete. Fig. 56 exhibits the fœtal surface of the placenta. The umbilical cord, containing its two arteries and its vein, is seen reaching the placenta at its centre, and dividing its vessels into numerous branches, which radiate towards the circumference. In other animals, as the ruminants, the tufts are separated from each other and distributed to different parts of the whole chorion, so as to make a great number of placentas. In certain other genera, the tufts consist of zones, surrounding the oval ovum; or they are scattered everywhere, like a paste, over the entire superficies of the ovum.

Fig. 55.

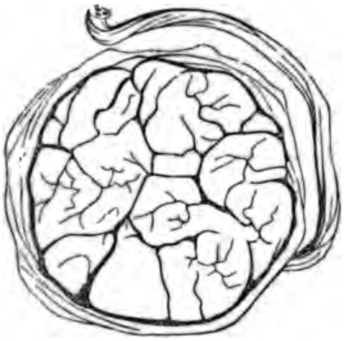
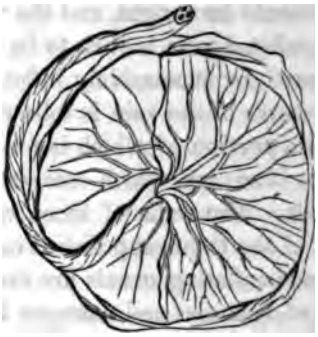


Fig. 56.



To possess a gravid womb at term, and enjoy an opportunity to examine it leisurely, is to be what Noortwyck calls *rarissimum hocce spolium mactus.* Even in London, Professor Owen appears to have waited long before obtaining such a privilege; and Dr. William Hunter says, that "opportunities of depicting the human pregnant uterus at leisure, very rarely occur. Indeed, to most anatomists, if they have happened at all, it has been but once or twice in their whole lives." (*Anat. ut. Hum. Grav.*)

I have enjoyed but few such opportunities during a long course of business in a great city. Those I have had were as carefully improved as my means would admit; and as I must confide in my own, rather than in other men's senses, I find it impossible, under my own observations, to adopt the views of the Hunters, and I prefer the opinions of Seiler and of Velpeau. One ought not lightly to dissent from great authorities, nor is it without a sentiment of profound respect for the

Hunters, that I claim the privilege to see with my own eyes, in a matter so authoritatively determined by those great benefactors of Medicine.

In what is called Deliverance, the *whole* placenta comes off from the womb. Kiwisch doubts that this is the case, supposing that a portion only of the maternal part comes off with the fœtal portion.

As a general rule, the placenta is separated from its place on the vault of the fundus, by the same pain that chases the buttock of the child into the vagina, and is completely extruded from the genital fissure in about ten minutes: sometimes it is expelled within twenty minutes after the commencement of a labor.

I have removed a great number of placentas without staining the hand with blood, or perceiving a drop upon the mass itself.

The placenta comes off with equal readiness at the third, fifth, or the ninth month, showing that no other action of the womb is required for its expulsion than shrinking of its muscular tissue, and that all times and stages are indifferent as to the facility.

I find in dissecting the gravid womb at full term, that the slightest traction suffices to remove the placenta from the surface where it had ever before enjoyed an undisturbed attachment; and that, too, very soon after death. I am convinced that the connection may be broken up even by puffs of air from the blowpipe; and that it is not more adherent than is the peel of a perfectly ripe orange to the fruit. Can it be that the womb may exfoliate its half of the placenta with such amazing facility, and that, too, in all the stages of pregnancy? Do these facts consist with the idea that arteries pass from the womb into the placenta? Are other arteries broken so easily? Has the womb its half of a placenta?

I shall subsequently mention the case of a lady who died here in June, 1848. In the *post-mortem* examination in presence of Dr. Yardley and Dr. Wallace, I detached the whole of the placenta from the womb, after the careful injection of the aorta made by Dr. Wallace, an expert anatomist, who had secured the external iliacs before throwing the injection into the trunk. Neither I, nor those gentlemen, upon the most minute and careful search, aided by good lenses, could verify the existence of even a single vessel passing from the womb to the placenta. Much of the injection was effused into the cellular meshes of the placenta. It was an infiltration of the material and not an injection, in the anatomical sense of the term. We arose from the dissection, equally and unanimously convinced that we had not seen a single vessel broken off or pulled out, in the slow, gentle, and most careful divulsion of the two surfaces, uterine and placental.

This examination was made within less than twenty-four hours after the demise of the lady.

During the epidemic of cholera here, in 1832, I examined a gravid womb at term within a very few hours after the death of the woman, in company with the late Dr. J. Hopkinson, then prosector at the University of Pennsylvania. He, though a practical anatomist, was unable, as I was, to detect anything broken, save mucous tractus, though the light and the glasses were good, and the most scrupulous care was used, without precipitation or rudeness in the operation.

A similar opportunity was enjoyed, a few years since, at the Pennsylvania Hospital, in a womb gravid with twins. Here, also, I detected nothing but mucous tractus. Another very fine specimen, at the seventh month, was afforded to me by Professor Pancoast at the Jefferson College. In this case, many medical students observed the divulsion of the surfaces without detecting any vessels. I have had other similar opportunities, and obtained the same results.

On Friday, Dec. 15th, 1855, I examined the dead body of Mrs. ——, late a patient of Dr. Weevil, in presence of that gentleman, Dr. Condie, and Dr. E. Wilson. She died of phthisis near her term. In the act of detaching the placenta from the womb-surface, we all with entire unanimity declared that we could not perceive that any vascular tract was broken asunder by the gentle, very slow, and most carefully observed process of disruption or separation of the two surfaces, uterine or placental.

I had a similar opportunity lately at the Blockley Hospital, when many physicians agreed with me in declaring that no vessel was seen in separating the placenta from the womb.

These are the opinions I adopt; but when so many explanations abound, who is he that can feel perfectly assured of the soundness of his own? There is one argument against these opinions which I conceive it a duty to state; for that which I desire is, the truth. The argument may be presented as follows:—

It is admitted that bloodvessels, whether arteries or veins, or capillaries, when deeply inserted within the tissue of an organ or viscus, always leave their additional coats and go within the intimate tissue solely as *membrana vasorum communis*. Professor Burdach calls this lining membrane ENDANGIUM, a word more easily pronounced than the common Latin term, or the long English compound word lining-membrane of bloodvessels. I greatly prefer, therefore, to employ the word *Endangium*, after the illustrious German teacher. Raciborski, also, in his elegant treatise on the veins, published in the *Transactions of the Royal Academy of Sciences*, clearly shows that the true bloodvessel is n fact this very membrane, and that the other textures found in larger rteries and veins are merely the protectors of the real vessel in its ransit from the heart to the distal point in which its essential offices re to be performed. On various occasions I have been struck with his appearance in the large sinuses of the womb, some of which are o capacious as to admit the introduction of a finger into them. Here, he lining membrane, endangium, or true bloodvessel rests upon the rery substance of the womb, having no fibrous or other coating interposed between it and its proper basement texture, the uterus itself. The strong fibrous coats of bloodvessels are never formed until after the essential endangium has for some length of time conveyed the moving blood along its channels. No one will deny this who has observed, with a microscope, the circulation of the embryo chick on the second day of incubation. Strong additional coats are gradually formed, and only in proportion as they may be requisite to resist the injection force of the heart.

It should be remembered that the womb is subject to great changes of condition. In the virgin, it is 2½ inches in length, and weighs about two ounces. At term, it is 12 inches long, and weighs as much as two pounds. After delivery, it makes haste, by involution, to return to its pristine weight of two ounces, which it would be impossible for it to do provided its great bloodvessels should have been strengthened with fibrous or elastic coverings instead of consisting, as they do, solely of the endangium.

As the womb grows, in pregnancy, many of its venous trunks become extremely large, and as they run in every direction in the womb-structure, some of them come so near the inner surface as to leave small spaces where the outer aspect of the endangium is destitute of any uterine basement. These thin or vacant spaces are chiefly seen on the part of the womb that is covered by the placenta, and are described by Dr. Lee as a sort of valvular apertures, representations of which he has given in an excellent plate in his *Midwifery*. The blood of the uterine veins would here press so strongly on the unsustained membrana communis as to rupture it were it not supported by the placenta, which acts as a cover or stopper, for the foramen, the removal of which would be sure to be followed by a rush of the blood.

During the process of its development, the placenta, which at first is a half-diffluent, softish mass on the exterior of the chorion, becomes continually of a firmer consistence. While it is in this half-plastic state, the blood driven along in the uterine veins moves with a force sufficient to cause the delicate endangium across the above-named vacant spaces to yield in form of a pouch or cul-de-sac, that impresses, indents, and sinks more or less deep into the softish mass of the placenta. These pouches or culs-de-sac are not properly vessels, but rather they are a sort of varicose state of the endangium, which contain the blood of the mother, yet keep it from all direct contact or mingling with that of the fœtus.

It is my belief that these culs-de-sac or varices of the womb-veins are the vessels which Mr. Hunter describes as curling arteries of the womb. In many and patient searches for them, I could never discover one single tube that could be called a curling artery, as Hunter denominates them, and I cannot believe they do exist as a normal condition of pregnancy. As to the idea of Hunter, strongly advocated still by eminent English writers, that the blood of the mother is poured into what they call the cells of the placenta, I am unable to comprehend how it is that very learned people do still adopt it, for if there are cells or vacuoles in the placenta, which I deny, any blood that might fill them can be none other than extravasated blood, and yet the gentlemen insist that this extravasated blood can and does return again into the sanguine circulation of the mother! It is as easy to suppose that blood taken into a basin in venesection should again enter the torrent of the circulation, or that the extravasated fluid of a thrombus or ecchymosis should find its way back again into the vascular system. If the mother's blood could be poured into the hypothetical cells or vacuoles of the placenta, it would die by coagulation, for coagulation, which must ensue, is the death of the blood.

The **blastoderm** or germinal membrane is probably a progressive stage of the original maculæ germinativæ, or primary solid, and is stated to consist of three layers, which are the outer or serous layer, the inner or mucous layer, and the middle or vascular layer, for accounts of which I refer the Student to Rudolph Wagner's or Müller's *Physiology*. I shall not pretend to say that I know of a truth that the vascular layer gives rise to the sanguiferous system, the mucous layer to the digestive, and the serous one to the dermal and muscular system, ideas which, however well founded in anatomical truth they may be, seem at least to be altogether fanciful and hypothetical. Nevertheless, as there must be a germ-point, I have no objection to consider the maculæ as the blastoderm, and as the analogue of the cicatricula in the birds' eggs.

After the absorption of the ovarian ovule by a Fallopian tube, and its fecundation there, it increases rapidly in size, the segmentation of the yelk proceeds, and the fecundated egg moves slowly towards the womb, which it enters from the tube within some five or ten days. Being detained in the cavity by falling in some deep sulcus among the convoluted mass of the swollen mucous tissue, it is there at last affixed, mesenterically attached, or conceived, for conception is synonymous with the permanent affixation of the germ.

It is presumable that the vitellary membrane which was originally what we called zona pellucida, now becomes transformed into chorion in part, and partly into the coating of the umbilical vesicle. The chorion is soon after this obsërved to be quite covered or clothed with innumerable villi or tufts, a kind of club-shaped conical or cylindric masses of cells that shoot out from the exterior surface and plunge their extremities like so many rootlets or pollen tubes into the orifices of the tubular glands, or wherever they may chance to find a resting place or materials for their endosmotic absorption. It is probably by means of these spongioles that materials for the nutrition of the ovulum enter within it; a view that derives some confirmation from the fact that the spongioles or tufts of the chorion disappear as soon as the placenta has acquired a sufficient degree of branchial and absorptive power.

The developing ovule is very soon covered completely up by the deciduous, or rather the muco-tubular mass in which it has fixed itself. The living point of womb surface to which it is affixed, now represents the utero-placental surface, for the placenta, growing from the exterior of the chorion, sits only there, but the ovule, hourly swelling or growing, pushes before it its covering that consists of the reflexed decidua or muco-tubular membrane which has invested the unattached portion of the ball like a cap or hood. Upon attaining a certain size in the course of the third month, this hood-like covering or reflexed decidua has become so much expanded and so thinned, as to give way before the enlarging ovum, which comes through the rent or hila and then applies its chorion directly to the muco-tubular membrane, or decidua vera which lines the whole interior of the womb. As the ovum grows onwards through the rent it has made in the reflex decidua, that body retires or shrinks back towards the placental disk and becomes a sort of ridge or cushion which we often find all round the placental margin.

The before formless mass within the ovum now begins to assume specific form and properties, by the evolution of a nervous and sanguiferous system; for, as has before been stated, the heart, originally a pulsating cylinder that thrust forwards a droplet of red blood, which ebbed back again as often as it was driven forwards, now begins to take on the proper forms and to be able to drive the red drop further and further into the softish, plastic mass until the track of the aorta is established. This aorta, after dividing itself as was shown into two umbilical arteries, and completely setting up the omphalo-mesenteric system of circulation, rises, as we said, on the sides of the allantois to the inner wall of the chorion, which it pierces like a cribriform plate to go on the outer surface and there spread itself out in the shape of innumerable capillaries, arterioles and ventles, whose tufted extremities apply themselves to the living wall of the womb. It is from that living surface that the placental vascular tufts draw the liquor sanguinis which the great umbilical vein next pours into the torrent of the fœtal circulation, where it is developed and converted into red blood through the force inducted by the endangium. Thus only can the bloodvessels be made; they are made by the blood itself which traces their paths, as it is injected by the heart into the soft and plastic sarcode mass. When once made, they ever afterwards restrain the blood, confine it within their own boundaries, and maintain its vitality by transmitting to it the forces of the nervous system of which they are the sole agents or machinery for this particular end; so that the blood, which created the vessels, becomes dependent on them for its whole subsequent life and powers.

The omphalo-mesenteric system appears to be designed as a means of maintaining the vitality of the yelk for a considerable period, indeed until the placental circulation being fully established there is no further use for it in the embryonal economy, after which it is laid aside and wholly disappears before the fourth month.

This omphalo-mesenteric apparatus does not, however, wholly perish, but loses only that portion of the vascular system that was spread on the umbilical vesicle. The artery, which is a mesenteric artery, and the vein, which is a mesenteric vein, is in fact the foundation of the whole portal system, on which depends the liver. The liver is supplied with blood from the portal vein and the hepatic artery, so that its great secerning office, so indispensable to the life of the creature, may with truth be said to spring in its origin from the omphalo-mesenteric circulation.

The **Allantois** is a sac or bladder that rises up from the pelvic or caudal extremity of the embryo, carrying on its sides the growing umbilical branches of the aorta. At first it is globular or oval in shape, because the abdominal walls of the embryo are still unclosed. But as these abdominal walls gradually lessen the aperture through which juts out the umbilical vesicle and the allantois, they all become confined in a narrowing opening which at last proves to be the navel. In fine, as the navel string attains its proper dimensions, they are inclosed within it in common with the omphalo-mesenteric vessels, so that the portion of allantois which is thus constringed within the navel and the umbilical cord becomes a mere tube. This allantoidal tube is the urachus; the portion of the sac remaining in the belly becomes urinary bladder; while all the rest of it which lies in the ovum between the amnion and the chorion is allantois. Air blown into the bladder then ought, after distending it, to run in the tube of the urachus, along the navel string, after passing through which it should proceed to inflate the true allantois.

Very clear descriptions of the allantois may be seen in M. Flourens' lectures on the generation of mammiferous animals, and in Prof. Coste's great work on the development of organized bodies. Both of those writers have illustrated the subject with engravings, those of Prof. Coste being worthy to be called truly admirable.

Umbilical Vesicle.—The human yelk, as I said, is a microscopic globule filled with vitellary corpuscles. When the blastoderm has partly undergone the morphological changes that convert it into the earliest rudimental embryon, part of the yelk corpuscles still remain unappropriated; and, as they are still contained in their original vitelline membrane, they constitute a small but visible ball called the umbilical vesicle. Originally, the vitellus was a sphere, as in the Figure 57 annexed.

Fig. 57.

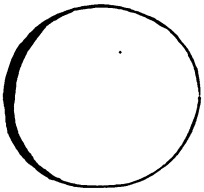
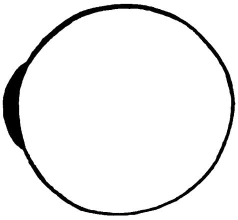


Fig. 58.



The blastoderm is developed upon a segment of this sphere, as in Fig. 58.

Fig. 59.

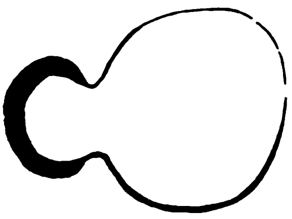
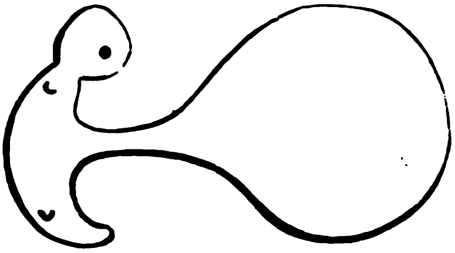


Fig. 60.

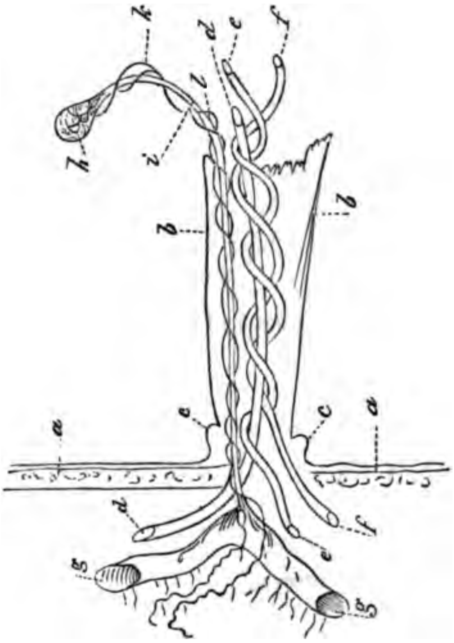


When the blastoderm doubles or folds its edges inwards, it pinches a portion of the vitellary ball, as in Fig. 59.

In a still further progress, Fig. 60, the portion of the vitellary ball that remains outside of the embryon is connected to the embryo by a delicate tube or vitellary duct. This tube or duct opens into the intestinum ileum of the embryo. Velpeau says that the yelk matter contained in the umbilical vesicle can be pressed along the tube and through it squeezed into the gut. It is supposed to furnish a pabulum to the early embryo, but is lost after the fourth month; for, by that time, the amnion has grown so considerably as to fill up completely the cavity of the chorion: Hence the umbilical vesicle, being squeezed flat betwixt the amnion and chorion, finally disappears, becoming of no functional value when the child has completely established its branchio-absorptive connection with the parent—just as happens to the urachus and allantois.

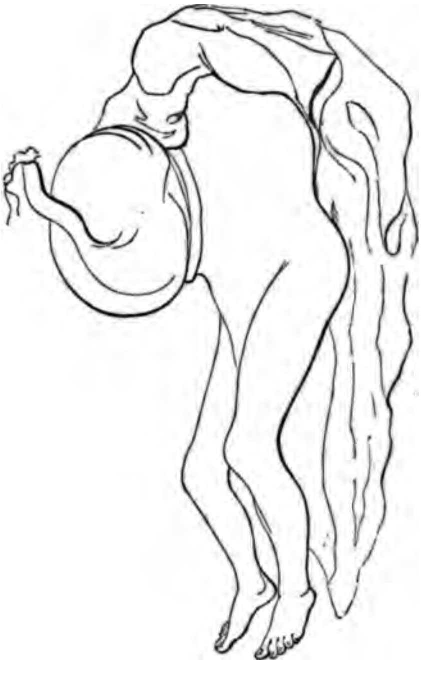
Omphalo-Mesenteric Vessels and Cord.—In perfect ova, aborted at the period of two months, or a little later, the Student will readily distinguish the umbilical vesicle shining through the chorion and lying betwixt it and the delicate amniotic membrane. I add here a figure (61), that may serve to explain its arrangement. Let *a* be a portion of the abdomen of the embryo, and *c c* the navel or umbilical ring; *b b* the navel string or cord laid open; *d* the umbilical vein bringing back the blood from the placenta, and passing into the belly at the ring to go to the liver; *e f* the two umbilical arteries of the fœtus; *h* the umbilical vesicle or vitelline sac, whose pipe, conduit, or efferent duct runs along the umbilical cord to the navel, and passing into the belly empties itself in the ileum *g g*, which bends up to receive the discharge; *k l* represents the omphalo-mesenteric vessels.

Fig. 61.



In very early states, the knuckle of ilium rises quite high up in the root of the umbilical cord—occasionally it becomes fixed there; and the child, continuing to grow, is at length born with an irreducible exomphalos. A careless accoucheur may, in cutting the navel string, have the misfortune to cut off the top of the arc of intestine, and thus subject the miserable neonatus to the disgusting inconvenience of an artificial anus, as happened in a case within my knowledge. I have seen the major part of the convolutions of the small intestines detained in an immense exomphalic tumor, covered only by the cord and a lining of peritoneum to which they irreducibly adhered. As the cord is essentially deciduous, no hope is left to save a child thus deformed. It is non-viable. Fig. 62 shows one of these cases that fell under my care a few years since.

Fig. 62.



Now, as the umbilical cord is lined externally with amnion, it is clear that the umbilical vesicle lies outside of the amnion and inside of the chorion within a space which, perhaps, might be properly called the allantoidal space. There is no doubt of the normal existence of this allantois or allantoides for the birds and the mammiferous quadrupeds; but as to man it is much questioned, and, as I have said above, it cannot be demonstrated that there is a sac that may be dissected out, existing betwixt the amnion and chorion. Noortwyck's fine dissertation upon it towards the end of his volume, "*Uteri Humani Gravidi Anatome et Historia*," 4to. 1743, appears to me to settle the question: in his criticism on Walter Needham's views of the sac, Noortwyck shows that it is indifferent whether there be a sac or no, for the space between the chorion and amnion is to all intents and purposes a true and sufficient allantois, one in which the urine of the early fœtus can be discharged, as it is well known to be in the allantois of the bird, in which urinous concretions may be found.

After all, the Student may rest satisfied upon the point, in so far as to understand that an allantois is a urinary bladder constricted in the middle, like an hour-glass; the narrow neck being the urachus; the interior sac being the ordinary bladder of urine, and the one lying betwixt the chorion and amnion the real allantois.

The embryo has now established its connection with the parent; it has surrounded itself with its amniotic membrane, which fills with the liquor amnii in which the new being is suspended.

As its umbilical cord comes out of the abdomen nearest the pelvic extremity of the embryo, it hangs suspended with its head downwards whenever the woman is in a sitting or standing posture. It is true that the cord lengthens daily, and sometimes attains the length of six feet, although inclosed in a womb never more than twelve inches long. With such a great length, or even with a cord of eighteen inches long, it can no longer be said to be suspended; still the cephalic extremity of it falls to the lowest place, and the fœtus as well as the embryo directs its head to the os uteri—it presents its head to the os uteri during the utero-gestation as well as in labor.

Circulation of the Fœtus.—The circulation of the fœtus is peculiar to it, and its continuance in the same way after birth is inconsistent with respiratory life. If, therefore, the fœtal circulation does not give place to the respiratory circulation, the neonatus perishes. This often happens. It is equally true, on the other hand, that, if the fœtal characteristics of the circulation are lost before its birth, the child must of necessity be born dead.

Let us inquire into the nature of the fœtal circulation.

The heart of the child in utero has four cavities—viz: a right and a left auricle, and a right and a left ventricle.

An opening in the septum auricularum, which is called the foramen ovale, or Botalli's foramen, and which, on the left side of the septum, is covered by a light floating valve, the valve of the foramen of Botalli, virtually converts these two chambers into one, just as two apartments are thrown in one by opening a wide door between them.

The left ventricle gives origin to the aorta. The right ventricle gives origin to the pulmonary artery. But, to speak rigorously, the pulmonary artery does not exist in the very beginning; for that which is called pulmonary artery is, in truth, the ductus arteriosus, from which the pulmonary artery afterwards arises at a more advanced period of the gestation. Seeing that this is the case, and that the ductus arteriosus joins the aorta below the arch, it is apparent that, when the right and left ventricles contract simultaneously, they concur, by their united power, to drive the blood along the tube of the aorta; and this combination of the force of both the ventricles is, perhaps, requisite to propel, not only the blood that circulates within the limits of the child's body, but also that which it sends far beyond those limits, to take up plasma and oxygen in the placental tufts, at the distance, sometimes, of six feet, and generally not less than twenty-four inches from the systolic source. Thus it is seen that the fœtal heart, though divided like that of the breathing warm-blooded mammal, into four distinct chambers, is, by means of the foramen of Botalli and the ductus arteriosus, reduced back, in fact, to the condition of the fish's heart, which has but two cavities, one auricle and one ventricle, while the placenta, which is its branchial organ of aëration, takes up, like the gills or branchia of the fish, the oxygen it finds in the medium wherein it exists. Thus the heart employs the strength of both its ventricles to carry on such an enormous circulation.

There can nowhere be discovered a more admirable adaptation of a simple machinery to produce compound results, than in that of the fœtal circulation; for, by the arrangement above mentioned, the single tube of the aorta is capable of effecting the double purpose of conducting the aërated blood to the tissues to oxygenate them; and, at the same time, of carrying back the carbonated blood to the placenta. The aorta, in this sense, is at once an oxygeniferous and a carboniferous tube. For, be it understood, the blood, when endowed with oxygen in the placenta, returns along the umbilical vein to the navel, and, running at the edge of the falciform ligament of the liver, enters the great fissure, and divides; part of the fluid entering into the hepatic porta, the rest continuing its course through the ductus venosus, is delivered into the left hepatic vein, which pours it into the lower cava. From the cava, it enters the lower, right, posterior part of the right auricle, behind the curtain-like valve of Eustachi, which conducts it across the posterior part of the auricle to the foramen of Botalli. Here, the current lifts the valve on the left side of the septum auricularum, to fill the left auricle. The auricle, being full, contracts, and pushes it into the left ventricle, whose next contraction injects it into the aorta: thus the oxygenated blood of the placenta reaches the aorta. Much of it is now determined to the brain and the superior extremities; the rest, turning through the aortic arch, is distributed in all the branches of that great trunk, a portion going back to the placenta again, in common with the carbonated blood of the fœtus.

This is the systemic circulation of the fœtus.

But that portion of the placental blood which passes into the carotids and subclavians, gives up, in their capillaries, its oxygen and part of its substance to the brain and upper limbs. It is next found in the veins, and returns to the right auricle, by the route of the superior cava, which delivers it into the top of the auricle in front of Eustachi's valve, and opposite to the *iter ad ventriculum dextrum*, which gapes to receive and ingurgitate it. As soon as the right ventricle becomes thus filled, its contraction follows, and this black blood, or venous blood, or carboniferous blood is injected into the ductus arteriosus, which pours it into the aorta below the giving off of the left subclavian, thus precluding the possibility of its return to the brain where its carboniferous nature would make it fatal, by the superinduction of asphyxia; for asphyxia is black blood in the brain. The venous blood that has thus returned from the encephalon and arms, mixed with the aërated blood, is, by this beautiful arrangement, carried with due precision back to the lower parts of the child's body, with a portion of the carbonated blood of the trunk and lower extremities. The umbilical arteries receive their share of this mixed blood, and deliver it to the placental tufts, whence it returns through the same round of circulation as before. By this curious machinery of the cavities and openings of the heart, there is a crossing of the currents of red and black blood in the right auricle—the red blood running horizontally across the posterior part of the auricle, behind Eustachi's valve, and the black blood falling perpendicularly downwards from the aperture of the superior cava, in front of it, into the iter ad ventriculum dextrum. Doubtless, the valve of Eustachi contributes much to the perfect operation of this mechanism, while Botalli's valve insures it.

The branchial apparatus above described suffices, in all the mammals and birds, to communicate to the constitution of the embryo the requisite amount of oxygen; but it ought to be observed that that amount is small, indeed, compared with the freeness of the endowment required for a state of respiratory existence. The embryo requires no more than what suffices to oxygenate its fluids and solids to the extent of provoking an active nutrition and imparting a power of gentle and infrequent muscular motion—for the fœtus in utero may be regarded as torpid, and approaching in torpidity to the state of a hybernating animal. To cut off even this slender supply is to insure its destruction. Now, inasmuch as the placental blood, entering in at the umbilicus, passing by the ductus venosus to the inferior cava, along that tube to the auricle, and through the foramen Botalli to the left auricle, left ventricle, aorta, carotids, and vertebrals to the brain, takes the only possible route from the placenta to the brain; it is clear that, if, before the birth, the foramen ovale should be closed, no oxygen could possibly reach the brain. But oxygen in the brain is essential to the evolution of nerve-force. When, therefore, no oxygen reaches the brain, the brain evolves no nerve-force, and the patient dies asphyxiated. The law, then, is that the fœtus is born with an open foramen ovale, which becomes closed after birth, generally within three or four days, often in ten or twelve days, not rarely about the twentieth day, and sometimes never.

I have said that the child's foramen Botalli remains open during the whole uterine life; but the Student ought to observe that it is always covered by its valve, lying upon the left side of the septum—a valve so light and delicate as to be transparent, and so beautifully arranged as to enable it to cover the aperture in the most perfect manner. If the child should lie on its left side the weight of a drop of blood, on its right side, might lift, as a drop on its left surface might shut it down if lying on the right side. The normal direction of the current through the foramen keeps it open in the fœtal heart. When, therefore, after the child is born, the two auricles act at the same time, in equal times, and with the same intensity, the valve is pressed upon the opening to cut off the fœtal route, and compel the whole of the right auricular torrent to pass into the right ventricle. The first act of the diaphragm by expanding the fœtal lungs opens a way by which the blood of the pulmonary ventricle may flow off through the pulmonic vessels, which they could not perfectly do before, for it is the expansion of the lungs that takes away the fœtal atelectasis. If the left auricle should, after the child is born, be the strongest, the earliest, and the longest to contract, it is impossible that any black blood should come into it. If, on the other hand, the right auricle should, after the birth, contract sooner, longer, and more energetically than the left, the valve of Botalli would be lifted, and the black blood of the venous system, instead of flowing off by the pulmonary ventricle and artery to the lungs, would in part pass to the left auricle, ventricle, and aorta to inundate the neurine of the brain with its carboniferous stream, which, wholly incapable of exciting any biotic force in the brain, would end in cyanosis—asphyxia—death. When the nervous mass ceases to act, the whole constitution is dead; it always ceases to act where there is no oxygen. Where the oxygen reaches it in quantity insufficient to extricate the just amount of neurosity, the functions fail of their just force and regularity.

The Student will now understand that when the child is born at full term, its peculiarities, as to the structure of the heart, remain for some time unchanged; and he will be able to appreciate certain conditions of the *neonatus* dependent upon the continuance, partially, of the fœtal circulation—a circulation, in which the aëration of the blood is of so low a grade that it cannot supply the demand for the more vehement energies of the respiratory life.

Children are sometimes born dead without any known cause. It is probable that, in some of the instances, death has taken place in consequence of the too rapid progress of the development of the heart, which, hastening to reduce its fœtal openings to the smallest diameter consistent with intra-uterine life, urges the reduction of the apertures beyond the legitimate bounds, and thus renders death inevitable by cutting off a part of the already scanty supply of oxygen to the neurine of the fœtal brain.

If, in its gyrations within the womb, the child should enter a coil of the navel-string, and, passing through it, should thus make a knot on the cord—that knot, happening to be strongly drawn, might cause its death by hindering the complete return of the blood of the placenta. Sometimes two, or even three, such knots are found on the cord. I delivered a lady here of a very fine child which was dead-born, apparently from the closeness with which a navel-string knot was thus tied. It is true, however, that we meet with very healthy and vigorous children, notwithstanding the presence of one, or more than one of these knots on the cord, which, however, have not been tightened.

Since pressure on the cord, and obstruction of the course of the blood in it, may cut off the fœtus in utero, it is evident that, where the cord prolapses in a labor, it may be fatally pinched betwixt the bony head of the infant and the osseous wall of the pelvis—nay, the resistance of the os uteri, vagina, and orificium vaginæ, may suffice fatally to compress it. Of this, however, we shall speak in another page.

The child in utero is liable to a great variety of diseases, and to accidental monstrosities of structure that exert a very unhappy influence upon the labor. Thus it happens that the encephalon sometimes becomes the seat of a dropsical effusion, a deformity which renders the size of the head so vast as to make its transit through the pelvis impossible, until, by an embryulcia, the hydrencephalic fluid shall have been discharged.

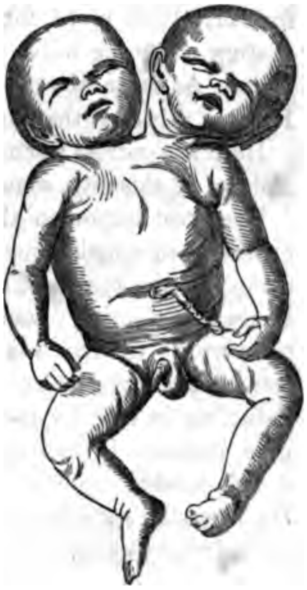
In like manner, vast collections of water in the abdomen constituting ascites of the fœtus may render the belly so large that the child cannot be born until it shall first have been tapped, which may be readily done with the long trocar, described by me in a future page, or by means of Holme's perforator, in cases where the signs of the death of the fœtus are absolutely unmistakable.

It is proper that the Student should be here made aware that some of these great watery swellings of the belly of the fœtus have, upon examination, been discovered to be cases of distended urinary bladder. The urinary bladder of the child has been known to rise as high as the scrobiculus cordis, and distend the belly like an enormous ascites, in consequence of obstruction or atresia of the urethra. The treatment of such a case, of which the diagnosis, before its delivery, is impossible, is the same as for ascites—*videlicet*, the paracentesis abdominis—which, reducing the swelling, allows the birth to be effected.

In addition to the cases of disproportion effected by dropsical collections, there are instances of accidental disproportion resulting from the union of two fœtuses in one. The celebrated example of the Siamese twins is familiar in the United States, and it is easy to conceive that such a union could not but render difficult and preternatural a labor in which such twins should be born.

The instances of children with two heads are not rare, numerous examples of them being contained in the books. The example that has been so admirably described by M. Serres, in his *Anatomie Transcendente*, appears to me to be particularly worthy the Student's attention. This monster was born at Sassari, in the kingdom of Sardinia, in the year 1829. There were two heads, a double thorax, with four arms, and one abdomen with two legs. Being christened, the one on the right took the name of Rita, and the left one that of Christina. Rita-Christina was brought to Paris and exhibited there, until death closed the exhibition when the monster had attained the age of eighteen months. I subjoin a figure which represents a case of double-headed fœtus, born in Adams County, Penna., in 1844, under the medical care of Dr. Pfeiffer, a German physician in practice there, who brought the monster to this city. I engaged Mr. Neagle, one of our best artists, to paint a portrait of it, from which this small cut is taken, and represents it very correctly.

Fig. 63.



In this figure it is seen that the monster possessed only a right and a left arm, whereas Rita-Christina had four arms, because, in her case, the cervical, dorsal, and lumbar vertebræ were complete for each child; whereas in this sample, the cervical and dorsal vertebræ only of each child were complete, while they united in a common or single lumbar spine, and one pelvis. Rita and Christina each had its own ribs, and a sternum for each, yet admitting of a single thoracic cavity for two hearts, and only two lungs. The liver was a compound of two livers; there were two stomachs, two duodenums, two jejunums, and two ilia, uniting, towards their lower extremities, into a single short ilium, inserted into a single cæcum. There was but one colon and one rectum, and one bladder of urine.

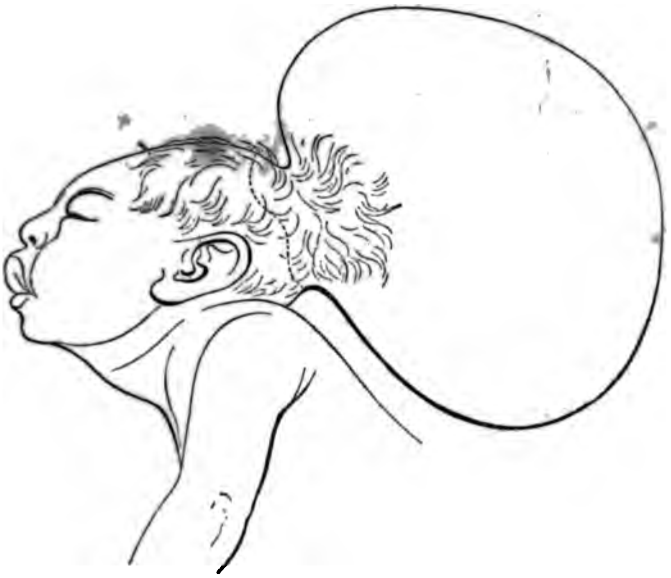
The *Comptes Rendus* of the French Academy of Sciences for Sept. 4th, 1848, contains a description, by M. Valenciennes, of a porpoise with two heads, but having, like the child in Fig. 63, only two arms.

There is, in my collection, a specimen, consisting of two children united by the ileum intestine, which comes out from the navel of each child covered by the umbilical cord. The two cords, midway betwixt the children, merge into a single umbilical cord, inserted into one placenta. This specimen was presented to me by Dr. Clarke, of Philadelphia County. The children are separated by the omphalodymic cord about four inches; and there are two apertures in the cord, each of which is an accidental anus, from which the meconium escaped freely. There are also two apertures from which flows the urine produced by both children. There are many cases to be met with, of children with only one head, yet possessing two bodies and four legs; and some, in which the heads are united at the summit, or crown. I refer the Student to the *Amer. Journal of the Med. and Phys. Sciences* for July, 1855, p. 13, for a paper illustrated with engravings representing a double fœtus, presented to me by Dr. G. W. Boerstler, of Ohio. As those illustrations are copied from fine photographs by M. Root, of this city, they are to be relied on as faithful portraits.

Here is a correct portrait of a fœtus that was shown to me by Dr. Rohrer, of this city, soon after its birth under his professional care.

The great tumor on the vertex consisted of scalp lined with the ordinary encephalic meninges, and filled with the water of a vast dropsy of the brain. The posterior part of the parietal and occipital bones was wanting; some hairs grew on the part of the tumor near the vertex; the rest was bald. The child was in other respects well formed, and very large. The tumor was soft and fluctuating, but not reducible in size by pressure in the hands. Its greatest length was nine inches. I shall refer hereafter to this figure, to that of the double-headed monster of Dr. Pfeiffer, and to Rita-Christina, and to Dr. Boerstler's specimen, to show the necessity and nature of what is in Midwifery called Evolution of the fœtus in all such cases. Observations on the midwifery of the case would be out of place on this page.

F g. 64.



M. Serres's work, and that of M. G. de St. Hilaire, exhibit a great variety of Teratological fœtuses, to which I must merely allude, as the limits of this volume will admit of no extended observations upon them.

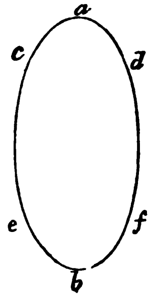
I have mentioned them here, chiefly with the view to put the Student on his guard as to the midwifery of such cases; and still more in order that he may early learn that these monsters are merely results, not of excess, but of failure in development. The double-headed fœtus, Fig. 63, has two stomachs, and probably two hearts, but only one intestinal canal, composed by the union of the two jejunums, or the two iliums, into a single jejunum or ilium, a colon and rectum. This child is a twin, which has not acquired a superfluous head, but which has lost, one a left, and the other a right arm; one the right, and the other the left half of its thorax—one kidney—half the colon and rectum, half the bladder, testes and penis, and a right or a left leg.

This double-headed fœtus then has lost, not gained: it has been fused, or, to use a term in horticulture, grafted. The right child has sunk part of its body in that of the left child, which in like manner has sunk the right half of its body in the left half of its twin brother. In Rita-Christina, if both children happened to be asleep, and one should tickle Rita's foot, she would wake and smile: so, if Christina's foot were tickled, it would cause her to laugh, without at all affecting her sister, for the left leg was Christina's and not Rita's, and *vice versa.*

Happily, when twins are conceived, they inhabit each its own amnion, and in some instances, its own chorion—which insulates them. When the development of the amnion fails, and the two germinal membranes are suffered to come into contact within the womb, they may unite, or weld, or engraft together, under a certain law; but the back of one cannot unite to the abdomen of the other, nor the head of one child to the other's pelvis. In order to unite, only the edges of the still unclosed germinal membrane can weld—that is, the left edge of one with the right edge of the other, and *mutatis mutandis.* Hence the law of development is binding; that law ordains that the right edge of the membrane, when bent over to shut in the trunk, should unite with the left edge turned inwards in like manner. Hence, it may fuse with the left or the right edge of its fœtal twin.

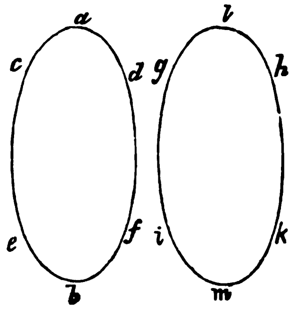
If we might suppose the germinal area of the germinal membrane to be in shape a long oval, like Fig. 65, and *a* the cephalic pole, *b* the pelvic pole; *c d* the brachial, and *e f* the crural regions; we may conceive that no sublunary power could develop a pelvis at *a*, or a head at *b*; a leg at *c d*, or an arm at *e f*; for even in this microscopic mass the generic law is as imperative and coercive as the attraction of gravitation is for the whole universe. There is nothing generically in common or identical in *a* and *b*, or between *c d* and *e f*; *c* unites with *d* only, and *e* with *f* only; when the scaphoidal germinal membrane has become completely bent so as to bring into apposition the edges *c e* and *d f* to make the cavity of the belly and thorax, *d* could not unite with *e* nor *c* with *f*.

Fig. 65.



If in the adjoined diagram, Fig. 66, the two ovals may represent the germinal areas of twins, not separated by amnia, then *a* and *l* may unite if brought into apposition, or *b* and *m*; *c* and *g*, and *e* and *i*, have no affinity. If *d* and *g*, which have affinity, should unite, the result would be a fœtus with one head, two arms, and four legs; if *f* and *i* be placed in contact in utero, their affinity would cost a left leg for the right hand membrane, and a right leg for that on the left. Thus we should have a Rita-Christina. It is a curious subject of reflection, that of the individuality or du-

Fig. 66.



ality of a creature with one head and two bodies, or with two heads and one body! Rita-Christina was dual, as was Dr. Pfeiffer's monster, Fig. 63; but as to the monster figured in Serres's Plate 12, it is to be doubted whether the personal identity was absolute for each of the children—as there was one common cerebellum. Doubtless it is not possible, in Teratology, to suppose that half of one child should sink into and be totally lost in half of another child, thus making out of two independent personal identities a single one. In nature, the union must take place from the liver upwards only, or from the liver downwards only; whence, it cannot happen that the whole right symmetrical half of the left twin should be sunk in the left symmetrical half of the right twin. We may therefore expect to meet with cephalodym or hepatodym or pelvidym, and not with such a union of two personal identities as would serve to personify the ancient fable of Salmacis and her lover.

All such fusions imply loss, not gain of substance—monstrosity by default, and not monstrosity by excess. If a child is born with six fingers on either or each hand, or six toes on either or each foot, it presents a case of excess of development, or monstrosity by excess; and the samples of five-legged calves, &c., that are commonly met with, are, perhaps, cases of monstrosity by excess.

There was a singular example of cephalodym here some four years ago: it was a healthy pig with one head, two fore legs, and two abdomens, with four hind legs. It was a remarkable fact that the genitalia of this creature were not under a common influence of its cerebro-spinal system. When the animal was in heat, it was either as to the genitalia of the right or those of the left trunk; but they were not observed to be in heat or rut at the same time, one trunk appearing to become the subject of the periodical excitement about ten days after the other had ceased to be so. What was the real condition of the identity of this monster!

The instances of monstrosity by default of development are sufficiently numerous; as, for example, in the cases of spina bifida, of anencephalous and acephalous fœtuses, and of fœtuses with imperfect limbs; and those with imperforation of the rectum, and with other atresias.

The Student will have little trouble to understand and explain these strange freaks of nature, if, in all cases, he will remember that the monstrosity is dependent either upon fusion of the parts of two different children, or excess in the development of otherwise natural parts, or on cessation, during the embryonal stage of life of that growth and progress which, but for the arrestation, would have finished and rendered complete, parts that now exhibit the appearance of the most shocking deformity.

We meet with numerous cases of ectopy; cases in which organs or parts are displaced or deviated. In Fig. 62, page 217, is the picture of a child born here under my care. It lived for several days. The tumor on its belly is an exomphalos, consisting of the entire liver of the infant, which was contained within the root of the umbilical cord. There was no covering of this liver save the deciduous matter of the cord. Of course when the cord should fall after five or ten days, the liver would be wholly exposed. Such an accident renders the child absolutely non-viable. I possess another specimen, in which every abdominal viscus is outside of the belly inclosed within the umbilical cord.

Duration of Pregnancy.—The duration of gestation is ordinarily computed to be nine months or 280 days; and the Women, who understand these questions by a traditionary learning, commonly make their calculations with sufficient accuracy.

According to the Civil Code in France, a pregnancy may properly be held to continue until the 300th day; which is allowing a latitude of twenty days beyond term. I have been surprised to find how prevalent has been in all ages the opinion that a great latitude exists as to the duration of pregnancy, and that some of the ablest men of our profession, both ancient, mediæval, and modern, have admitted a latitude far greater than that allowed in the French Code. I rejoice that this is the case, because, having myself had reason to believe that pregnancy may endure even beyond twelve months, as I shall relate in another page, I conceive it desirable that the truth should be established for the conservation of the credit and peace of individuals or families, in cases where such extraordinary postponement of the term might give rise to the greatest injustice, as well as unhappiness. A great controversy arose in Europe in 1764, which was carried on by various writers until 1770, and brought out the opinions of the most celebrated medical men of the time; a collection of pieces on this subject, in three volumes, is in my library. The dispute arose on the question of legitimacy of a child, whose father, Charles, born January 15th, 1689, was more than 72 years old when he married Renée, Marchioness of Ingreville, who was at the time 30 years of age. He lived four years with his wife, and had no children. On the night of 7th–8th of Oct., 1762, he fell sick with fever, and violent oppression, which continued until his death. During his illness, his wife Renée did not sleep in his apartment. He died with gangrene of the leg, on the 17th of Nov., æt. 76 years. More than three months after his death, Renée gave signs of being pregnant. She was observed and carefully assisted by order of the collateral heirs, and gave birth to a son, Oct. 3d, 1763. From Oct. 8th, 1762, to Oct. 3d, 1763, is one year, lacking five days. The question was submitted to various leading medical persons for their opinions as to the legitimacy of the child, and the said three volumes exhibit the most striking examples of the disagreement charged among doctors, many strongly denying the possibility of Renée's purity, and others as earnestly vindicating the legitimacy of her son.

It would seem that the most common and ordinary observations and proofs are incapable of expelling from the public mind opinions long established, upon whatever foundation. There is hardly to be found an old wife in the country, who does not know that the term of incubation of the barn-door fowl is uncertain; and that, though it ordinarily lasts twenty-one days, the chick may be found to escape from its shell on the twentieth, or to linger in it, sometimes, to the twenty-second or twenty-third day. Similar facts as regards the gestation of our domestic quadrupeds are abundant, and sufficient to demonstrate the latitudinarian character of what is called term. To show the differences in gestation, I subjoin the following tables which I find in M. Rainard, *Traité complet de la Parturition des principales Fémelles Domestiques*, tom. i. p. 233, *et seq.*

The date of the Covering was noted as to fifteen mares, of which eight foaled after 340 days, three after 342 days, three after 343 days, and only one at 346 days.

Brugnone, in like manner, in fifty-five mares found that the foaling took place in

1 in 10 months and 7 days	5 in 343 days
1 " 11 " " 1 day	2 " 344 "
2 " 330 days	3 " 345 "
2 " 333 "	4 " 346 "
2 " 334 "	4 " 347 "
2 " 335 "	1 " 348 "
4 " 336 "	2 " 351 "
2 " 337 "	2 " 352 "
2 " 338 "	1 " 353 "
1 " 339 "	1 " 356 "
3 " 340 "	1 " 357 "
1 " 341 "	1 " 369 "
3 " 342 "	1 " 389 " or 13 months.

"The difference between the most precocious and the most protracted gestation amounts here to seventy-seven days, or two months and a half. From his table, Brugnone concludes that the gestation is not complete in less than one year, and that, when it goes beyond that term, there is no fixed period."—P. 233.

M. Tessier found that in the gestation of 200 mares, there was a latitude of eighty-three days.—P. 239.

The *Journal d'Economie rurale Belge*, 1829, finds a minimum of 322 days, a mean of 347 days, and a maximum term of 419 days; difference, ninety-seven days.—P. 234.

M. Grille's statement, *Mém. de la Société Industrielle d'Angers*, No. 2, 11^e année, p. 55, shows in 114 mares a difference in gestation of ninety-three days.—P. 239.

The observations made by order of Earl Spencer, as to the gestation of 764 cows, show that the shortest period of gestation is 220 days, though the ordinary duration is of 284 or 285 days.—P. 235.

Among sixty-five sows, two littered on the 104th day; ten from the 110th to the 115th; twenty-three from the 115th to the 120th; twenty-seven from the 120th to the 125th; two on the 126th, and one on the 127th day. This is a latitude of twenty-three days.

M. Rainard further gives, from the *Bulletin de la Société Industrielle d'Angers*, the following statement of the duration of gestation in 154 rabbits, viz: one littered on the 27th day; seven from the 28th to the 29th; fifty-three on the 30th; sixty-one on the 31st; and twenty-nine from the 32d to the 34th day.

These statements show with sufficient clearness that the duration of gestation is by no means a fixed term in any of the observed genera, and I should suppose that the least reflection might lead one to the same conclusion, since the nature of the womb, as well as that of the child, is such as to render it impossible that the laws that govern the contractility of the one or the rate of development of the other, should operate in all cases in equal times and force. The womb of one individual, as well as the fœtus within it, may be ready for the act of parturition earlier or later, according to the force of a variety of causes to the operation of which they are subject.

The duration of gestation must bear some necessary relation to the mass of the fœtus to be developed. Yet, in the elephant, the young at birth stands only about three feet high, which is not higher than the new fallen calf or foal, though the weight must be far greater. In this animal, the gestation lasts twenty months, according to the showing of Mr. Corse Scott, who had one born of a dam in his possession in India. He noted that the gestation commenced about the

1st July, 1793, and terminated about the 1st April, 1795. An account of this elephant may be found in the *Brit. Cyclop. of Nat. History.*

Professor Asdrubali, in his account of the thirteen months' gestation of the Signora N., cites the following passage from Spigelius, who, in speaking of the causes of labor, or of the completion of pregnancy, says: "Hæc nulla alia esse potest, quam maturatio, et perfectio fœtus, quæ fit in utero incerto tempore et variis interdum mensibus, ob facultates corpus fœtus gubernantes vel debiliores vel robustiores."

The same author, Asdrubali, in his *Trattato Generale di Ostetricia Teoretica é Practica*, tom. v., gives us a succinct relation of the pregnancy and confinement of the lady, the Signora N., who carried twins in the womb over thirteen months.

Probably so great an extension of the uterine life of the fœtuses may excite the reader to feel surprise, and even to a denial of the facts of that case. But I should think that that elegant and learned Scholar, who gives us the history of the pregnancy, ought to be held worthy of our confidence; and I believe it would be difficult to read his fifth volume, which is devoted to the examination of the subject of protracted pregnancy, without being convinced, not only of the sincerity, but of the truthfulness of the author. And it seems to me a very desirable thing that that case should be fully reported in the works on medical jurisprudence for the better information of our courts and juries. I shall at least make an abstract of it in this place.

Case.—The lady, aged 26 years, was married on the 15th of April, 1793. She became pregnant in March, 1795, after having been married 21 months. The child, which was born in December of the same year, died on the 8th day. About the 1st of March, 1796, she was affected with symptoms which induced her to suppose she had again conceived. On the 13th of the same month, she removed to a neighboring district. Upon returning to her residence, she was shocked to find her husband, who was a nobleman, ill with a disease of which he died on the 22d of the same month. To the grief occasioned by the loss of her spouse were added great distress and embarrassment connected with the inheritance of his estate, and notwithstanding she early declared the existence of her pregnancy, she was much tormented and baffled by the relatives of her deceased husband, who treated her declaration of pregnancy as false. At the beginning of the *fourth* month of gestation, she perceived the quickening in the womb. Throughout the fifth and part of the sixth month, the movement in the womb was so violent as to have the appearance of constant convulsive action. Towards the end of the sixth month the motion almost wholly ceased. The abdomen appeared to be cold; the breasts became hard, and there was a discharge resembling whey from the nipples. It was about this time that her family quarrels, insults, and disappointments became most aggravated, and in this condition she passed through the sixth, seventh, and eighth months. At the commencement of the ninth month, she was seized with pains like labor-pains, and discharged from the womb a great quantity of watery fluid. The pains continued to recur during eight consecutive days. They now ceased, as well as the watery discharges, and the lady again began to feel the motions of the fruit of the womb, while the lower belly again recovered its feeling of warmth. The abdomen, which had ceased to grow, resumed its process of development. The breasts ceased to flow, and became flaccid. During the tenth and eleventh months, she experienced a sense of weight in the hypogaster, and had difficulty and pain in the act of urinating. In the course of the twelfth and thirteenth months, she was assailed, first every eight and then every fifteen days, with pains like those she had felt in the beginning of the ninth month. These pains lasted sometimes four and sometimes five hours alternately. On the 22d of April, 1797, she was attacked with symptoms of labor, and on the 29th gave birth to twins. The gestation seems to have continued from March 1, 1796, to April 22, 1797, a period of thirteen months and twenty-two days.

Such is a compendious relation of the case, of which the particulars are given in a long detail by Prof. Asdrubali. I lay it before the Student with the assurance that I cordially accept the story of the accomplished author, and that, notwithstanding it presents a rare example of procrastination of the Term, I find in it nothing impossible to believe, the more particularly as I have confidence in the correctness of the following statement of a case that fell under my own clinical care.

Having admitted the patient to my ward in the Pennsylvania Hospital, and having observed and attended her up to and in her accouchement, I rely on the facts as trustworthy.

Case.—Saturday, August 1, 1840. Being at the Pennsylvania Hospital, a lady came to me, and requested that, as a medical officer of the House, I would see A. G——n, in Clark Street, Southwark, in order to her admission into the Lying-in ward. I was told that her confinement, which had been looked for in April, had not yet taken place, that she was suffering under the effects of this unnatural pregnancy, and that the neighbors thought she ought to receive the cares of the Institution. Upon proceeding to Clark Street, I learned that she was twenty-six years of age, that she had been confined in the Pennsylvania Hospital on the 18th of February, 1839, and was again pregnant in the month of July, 1839, while suckling her son. Being very much indisposed, she called a physician, who directed her to wean the child, as she was doubtless pregnant. She did not, however, wean him until September, when she felt sure of her pregnancy. On the 20th of November she quickened, and her husband very distinctly perceived the motion of the child at Christmas. On or about the 10th day of April, 1840, being very large and lusty, she was taken in the night with the symptoms of labor, and called in her neighbors. She said the waters broke in the night, and wetted her profusely. After the rupture of the membranes, the pains were great, and she supposed the child would be soon born; but as the pains not long afterwards grew easier, she did not send for the doctor till morning; at that time, they had become much less distressing; in short, they gradually left her: but she continued big, and could daily, and even now, feel the child when it moved, which gave her great pain.

She was laboring under a decided hectical fever and irritation, that had already very much reduced her flesh and strength. She obtained but little sleep, and had a poor appetite. She daily suffered acute pains in the abdomen. I gave her a ticket for the Lying-in department, to come in on the 4th day of August. The os uteri was found to be not dilated, though the cervix was fully developed, having lost entirely its tubular or cylindrical form. The form of the abdominal tumor was *conical*, the umbilicus being at the apex of the cone. Two or three inches above the umbilicus was the commencement of an oblong tumor, extending to within a very short distance of the xiphoid cartilage, and about three inches in width by two in height. This was a hernia produced by the separation of the linea alba, through which protruded a quantity of the intestine, thinly covered, and restrained by the peritoneum and skin.

She remained in the ward, suffering daily and nightly with abdominal pains, until she fell into labor on the 11th of September, and the child was born on the 13th of September, about daylight. I sat up with her all night, being deeply interested to observe all the phenomena of the case.

The child, a male, was of a medium size, weighing seven or eight pounds; in good health. The labor was extremely tedious and distressing. She had a pretty good getting up, but the hernia of the linea alba caused great weakness, which was in a measure relieved by a truss made expressly for her. She was discharged October 11th, 1840.

Of course, in relating this case, I do not consider myself responsible for the truth of its statements further than as they are worthy of confidence in view of the character of the patient herself, and as the facts came under my notice. She had the appearance of perfect candor and sincerity in all that she said about it, and I have no doubt she thinks her pregnancy began in July, 1839, and ended, as I have said, on the 13th of September, 1840, having endured near fourteen months, or four hundred and twenty days, instead of two hundred and eighty, the usual term of a pregnancy.

In July, 1841, she is pregnant again, and still suffers from the protrusion in the upper part of the linea alba.

Lamotte, t. i. 313, Obs. xci., relates the case of Madame de ——, who had had children of former pregnancies, and who conceived in the month of January, during which she experienced all the inconvenient sensations to which she had been accustomed in antecedent gestations. In the middle of May, she quickened at the same period as on other occasions. She made her computations for the term for September. Supposing herself about to be confined, she summoned the monthly nurse, who remained near her until the labor terminated by the birth of a child much larger than the other children had been. She was delivered of the child at the beginning of February, making a case of gestation protracted through thirteen months.

Dr. Merriman, of London, has published, in vol. xiii. part. ii. of the *London Medico-Chirurgical Transactions*, a paper on the Period of Parturition, which contains an interesting table of the births of one hundred and fourteen mature children, calculated from, but not including, the day on which the catamenia were last distinguishable.

By this table it appears that three were born in the thirty-seventh week, thirteen in the thirty-eighth week, fourteen in the thirty-ninth week, thirty-three in the fortieth week, twenty-two in the forty-first week, fifteen in the forty-second week, ten in the forty-third week, and four in the forty-fourth week, of which latter, one was born at three hundred and three days, one at three hundred and five days, and two at three hundred and six days.

Dr. Merriman states that he has calculated a great many more cases in the same manner, but has restricted his table to the above one hundred and fourteen cases, because he was able completely to verify them. The others gave results so nearly similar, that he has no doubt of the general correctness of the principle he desired to enforce, which was, that conception takes place, in general, soon after the cessation of the catamenial flow, and not just antecedently to its expected return. The table is highly interesting, in the relations for which I would use it, showing, as it does fully, that there is a considerable latitude in the duration of gestation.

"Mr. Gaskoin communicated an account of suspended animation, during four years, at least, in a specimen of *helix lactea*, now living in his possession. A remarkable feature in this case is the fact that utero-gestation was suspended, and resumed its process with the resumption of vitality."—*Athenæum*, Nov. 30, 1850.

Computation of Term.—The ordinary term of a gestation is attained in about two hundred and eighty days, and it is customary among medical men to assign the two hundred and eightieth as the day on which the child may be expected to be born. In making the computation for my patients, my own habit has been, to inquire as to the day and date of the disappearance of the last menstrua; to commence the series on the day following the disappearance, and add two hundred and seventy-nine days to it. This mode has answered my purpose well enough, but it is clear that it would not answer for the calculation of term, in the case of a religious Jewess.

That experienced practitioner, and most judicious author, Professor Nægèle, of Heidelberg, in his *Lehrbuch der Geburtshülfe*, 8vo., 1842, in a remark at the foot of page 82, gives the following method of computing term. Let the woman reckon three months back from the day when her menses ceased, and to the said three months let her add seven days. The day thus found is the one on which she ought to expect her confinement. If, for example, she had her courses last on the 10th of June, let her reckon backward three months, to March 10th, to which she should add seven days, which would bring the calculation to the 17th of March. This would be the day, to wit: March 17th, on which the woman ought to expect her lying-in. Such is the method of calculation recommended by Dr. Nægèle, and it must be admitted that, as no man in Europe enjoys a more enviable reputation as a teacher and practitioner in our art, one might feel safe in following his example in the practice of it. Still, I cannot perceive why the seven days should be added to the three months, or, rather, to the whole term, since the Professor gives no reason for us to suppose that the ovulum is not both mature and ready for fecundation as soon as the catamenial flow has ceased, and the genitalia have recovered their fitness for the congress of the sexes. As I have had no reason hitherto to find fault with my own method, I shall continue to compute from the day of cessation; so that, if my patient should inform me she saw the last stain on August 27th, I should reckon backwards to July 27th, June 27th, and May 27th, which day I should indicate as the one on which the labor might be expected to commence, and not June 3d. My opinions as to the connection of the menstrua with the acts of ovulation are so settled, that I do not expect they shall be changed hereafter. Still, those opinions do not prevent me from supposing it sometimes possible for an ovulum to become mature, and even to escape from its ovisac, without exciting the usual mensual molimen—and even, also, that this escape might take place just before the period for the catamenial return, or at any other period. Under such fortuitous circumstances, a fecundation might be possible just before the period of return; and if so, the calculations as to term would be liable to give rise to a disappointment. In general, however, one may venture to rely that a general rule will hold good—while no great surprise ought to arise when an exceptional instance happens to fall under notice.

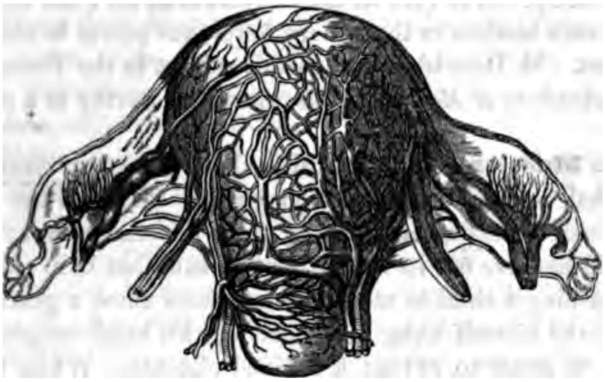
Changes in the Womb.—The form of the womb changes with the progress of pregnancy. The vaginal cervix grows shorter, and at length wholly loses its cylindrical, or tubular shape, leaving at the upper end of the vagina a convex or conoidal protuberance with a dimple in its apex, which is the os tincæ of the womb-at-term.

As the ovum expands, it carries the uterus along with it, at first making use of the cavity of the fundus and body of the organ, and only distending the *upper* part of the cervix in the first months of pregnancy; so that, if an examination should be made of a woman three months pregnant, the cylindrical cervix uteri would be found to have undergone very little shortening.

The cervix certainly becomes fuller and larger, at a very early period of pregnancy, and presents, in this respect, a sensible difference from its unimpregnated state. At the close of pregnancy, the tubular cervix uteri seems to have wholly disappeared, and the womb, instead of exhibiting a straight or cylindrical neck, is become conoidal, the os tincæ being at the lowest end. No decided change in the length of the cylindrical part is discovered by the Touch until after the fifth month, or, according to certain authorities, the seventh month. From that period it grows daily shorter, until the last days of gestation, when the cylinder is not discovered at all. A pregnant woman, therefore, in whom it has wholly disappeared, is said to be ready to commence the process of labor. The attack of labor pains may begin very soon after the disappearance of the cylinder of the cervix, or it may be deferred for several days, from causes which are not understood.

Figure 67 exhibits the form of the gravid uterus, which may be compared with that of the unimpregnated organ, Fig. 47.

Fig. 67.



In all instances that have fallen under my notice, the thickness of the walls of the womb, when at term, has been rather less than in the non-gravid organ. The tissue is much looser and easier to cut, and yields to any distending force far more readily in the gravid, than in the non-gravid state. It is incomparably more vascular, so that, in the last weeks of gestation, it may be compared to a purse or network of bloodvessels, with abundance of loose cellular tissue, and muscular fibres interspersed. I have sometimes compared it to a vast hollow aneurism by anastomosis, in order to express an idea of the abundant vascularity with which it is now provided, and by the agency of which it is enabled to fulfil the wants of the fœtus as to aëration and nutritive absorption. The uterine arteries and veins which reach the womb near its lower extremity, inosculate freely with the ovarian or spermatic vessels, that enter its texture betwixt the folds of the broad ligaments, to supply the ovaria, the Fallopian tubes, and upper portions of the womb.

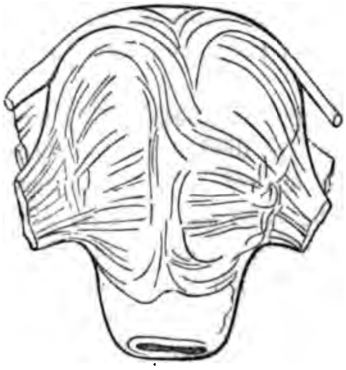
Smellie, vol. ii. p. 19, says that he had opportunities, in 1747 and 1748, of opening the bodies of two women who died at the full term of utero-gestation. The membranes were unruptured. They were each about a quarter of an inch thick. The same was the case with another specimen in his possession, which was in the eighth month of pregnancy. He had seen several others, in which the woman died soon after delivery, the womb not being much contracted, when the thickness of the walls was about the same as the above. But where the death did not occur for several days after delivery, and the womb was contracted, he found its parietes from one to two inches thick.

In the cases that I have seen of autopsy of the pregnant woman, I have always found the head of the child to present at the os uteri. I cannot agree with the opinion of M. Paul Dubois that the child is instinctively compelled to turn its head downwards, for I can neither discover any such instinct in the unborn fœtus, nor power to obey it if it should exist. M. Dubois's paper on this subject in the *Transactions of the Royal Academy of Medicine* is, however, well worthy of a perusal.

Uterine Muscles.—With regard to the muscular structure of the womb, I shall remark that no person who has witnessed the exercise of its muscles in labor, can doubt of their immense power; particularly should he have felt its force while the hand has been compressed by it, in turning a child in utero. Some years since, a gentleman of this city found himself obliged to introduce his hand completely into the womb, in order to extract a retained placenta. While the hand was employed in separating the afterbirth from the uterus, the os uteri closed upon his wrist with such force as to give him very severe pain, and he found it impossible to withdraw the hand, which was completely fastened by the contraction. After various unsuccessful attempts to extricate himself from such an unheard-of difficulty, he sent for a Bleeder, and, after causing a large quantity of blood to be drawn from the lady's arm, the spasm of the cervix ceased, upon which he was liberated from an imprisonment of two hours. His wrist was marked, as if a cord had been strongly bound round it; the red traces of which impression were visible even the next day.

The operation of turning the child in a powerful womb, from which the waters have been entirely drained, not unfrequently produces from pressure, a degree of numbness so great as to make it necessary to withdraw the one, and introduce the other hand—the sensibility and motion of the first one being wholly suspended; the resistance to be overcome in the expulsion of a grown fœtus requires a muscular force which cannot be exactly estimated, and must, therefore, be immense.

Fig. 68.



Different writers describe the arrangement of the muscular fibres of the uterus in different manners. The very discrepancies of these authors ought to convince us that their arrangement is not yet understood;

and, indeed, it is of no great consequence, in a practical view, that it should be demonstrated. It is enough to know that the fibres are so arranged as to tend, by their combined contractions, to reduce the uterus back from the gravid size to that of the unimpregnated organ. When their contraction is co-ordinate, the fundus tends to approach the os tincæ, and the sides tend to approach each other. Whatever is contained within the cavity of the organ is, under these circumstances, expelled therefrom.

It should be always understood that, in speaking of the muscular structure of the womb, we speak of the gravid womb only, in which the arrangement and condition of those fibres are perhaps very different from those of the virgin or the non-gravid organ. Fig. 68 is a representation of their arrangements, proposed by M. Chailly, which differs from the very beautiful drawing of a dissection of them, that is given in Dr. Moreau's Atlas. Both of them are unlike Madame Boivin's figure—and I have no doubt that every successive representation will differ from those that do, or may, precede it. My own attempts to extricate the tangled maze of muscular fibres leave me convinced that the only anatomy of them to be depended on, is the Transcendent anatomy—or that which is performed by the reason and not by the scalpel. He who has felt the womb contract upon his hand in a Cæsarean operation, or in repositing an inverted uterus after labor, or in extracting the placenta in hour-glass contraction, or in turning the child long after the waters are gone off, will have a better conception of the muscularity and of the arrangement and distribution of the muscles than he who trusts to the dissecting knife alone.

The action of the muscles of the womb ought, if normal, to be perfectly co-ordinate, all parts acting together, and at the same time. It is, however, true that, in the state of contraction, all the parts do not always begin and cease to act at the same moment.

Labor does not always proceed with regularity. The muscular power of the womb is occasionally found to be morbidly exercised. Those fibres that tend to bring the fundus near the os tincæ, sometimes fail to act, or act imperfectly; while those that tend to approximate the sides of the womb act with such force as to compress the body of the fœtus, and, instead of expelling, rather confine and detain it within the cavity. We frequently observe women to suffer under the most violent uterine pains, which nevertheless do not move the child downwards in the least degree; such pains should be suppressed, if possible, in order to admit of the co-ordinate and regular operation of all the fibres being restored, by temporary cessation or repose. It is such an action as this that constitutes the hour-glass contraction of the womb, which takes place in consequence of the non-separation of the placenta from the uterine surface—thus disabling that placento-uterine quarter from contracting equally with the rest of the organ. When this happens, the placenta is, of course, shut up within a cell, above the hour-glass contraction.

Obliquity.—The gravid uterus commonly occupies the middle of the abdomen, in hale young women, notwithstanding both the projection of the sacrum and the intrusion of the spinal column tend to give to it an oblique direction; hence, we generally find it to be inclined towards one side of the abdomen in persons of a lax and flaccid habit of body. So far as my observation enables me to speak, it is oblique to the left more frequently than to the right side.

Great degrees of obliquity are scarcely met with in first pregnancies, in consequence of the vigorous contractility of the symmetrical abdominal muscles, which constrain the gravid womb to remain in the mesian line; whereas, in women who have borne many children, those muscles acquire such a laxity and want of tone, as to allow the organ to librate from side to side, or fall to the front, according to the attitude of the patient for the time being.

A right or a left lateral obliquity becomes very evident if the woman stands on her feet. In general, if the organ bears over to the right side, its faulty direction will be corrected by turning upon the left, and *vice versâ*. In anterior obliquity, the fundus falls so far forward as to make the patient seem more lusty or larger than she really is. The figure is greatly improved, in such cases, by wearing a suspensory bandage, which assists the recti and obliqui abdominis to hold the gravid organ up nearer to the back bone. When a patient suffers herself to be annoyed by what she supposes to be an inordinate development of the womb, her fears may sometimes be allayed by showing her that, notwithstanding she is apparently enormously large, she is, in reality, not more lusty than common, and that the false appearance depends upon an anterior obliquity of the womb, which causes the belly to protrude unnaturally.

Pressure of the Womb on the Vessels.—Interference of the gravid womb with the functions of the kidneys, is now universally conceded to give rise to a convulsive disposition in pregnant women, that exhibits itself under the form of eclampsia, commonly known as puerperal convulsions. When the uterus has become inordinately large and heavy, and when the woman is at the same time affected with costive and overloaded bowels, it can scarcely be supposed that the great emulgent veins should not suffer more or less from pressure, obstructing the course of the blood returning from the interior of the kidneys. One could easily imagine that this pressure upon the emulgent veins should have an obstructing power almost equal to that of a ligation of the vessel. Under such circumstances, the Bowman's capsules, which contain the essential secretory apparatus of the kidneys, would be so distended as to suspend, in a good measure, their offices, and so the azotized elements appointed to be carried off by the urine would remain, and continue to accumulate in the blood. The nervous disorders consequent on this vitiated condition of the circulating fluid, are signs of the uræmia; and the convulsions, and other signs—as paleness, weakness, delirium, &c., are symptoms of an uræmic intoxication. Any woman approaching the period of her confinement, who has a swelled, or œdematous leg, may well be suspected as prone to uræmic intoxication, and, provided she is vexed with headache, nervous twitchings, or any disorder of the senses of sight, hearing, &c., she should be at once taken care of, and all proper measures should be adopted to prevent the explosion of an uræmic convulsion.

Women in whom the abdominal muscles have not lost their tone, by repeated extensions in pregnancy, compress the uterus strongly, in a direction towards the back; whereas, those whose abdominal muscles have become weakened by repeated gestations, carry the child very low, to use a common term, allowing the enlarged womb to rest upon the muscles in front of it. In the former case, the pressure of the organ against the spine must, to a greater or less degree, interfere with the current of blood in the great vessels of the abdomen. Hence the aorta and iliac arteries, and some of their branches, will pass on their contents with less freedom than is natural, whereby the upper parts of the body become supplied with more than their due proportion of the arterial blood. Headache, vertigo, flushings of the face, and tendency to paralysis and convulsions, may fairly be attributed to excessive momentum of the blood thus distributed to the superior parts, and rendered doubly noxious by an accompanying uræmia. Sighing, præcordial distress, dyspnœa, and coughs are also found to depend upon the same principles, and are to be treated with a view to lessen this vicious distribution and sur-accumulation of the vital fluids.

Venesection, looseness of the bowels, light diet, warm baths, and whatever tends to produce moderate relaxation of the muscular forces, are in general employed with signal success in these circumstances.

Dr. Collins, App. 199, remarks, that "Puerperal convulsions occur almost invariably in *strong plethoric young women, with their first chil-*

dren, more especially in such as are of a coarse, thick make, with short necks." He adds, at p. 201, "that of thirty cases occurring during his Mastership, *twenty-nine were in women with their first children.*"

Can this excess of propensity to eclampsia in primiparæ be attributed to any other cause than those excessive sanguine determinations to the head, above indicated, and the disordered function of the kidneys, above spoken of? Ought we not to expect convulsions in women in the first labor, when we reflect upon the tendency to hyperæmia of the brain, caused by the above mentioned restraints of the downward circulation? My experience in Midwifery having long since taught me to be watchful of the signs of any excess in such determination of the blood, I rarely permit my patients to lie on the back to be confined; for I have been for some time impressed with the opinion, that women who lie on the back in labor, especially in first labors, are more liable to convulsion on account of the greater pressure against the large vessels within the belly; a pressure which, at least, is always relaxed during the absence of pain, in such as lie on the side.

I have frequently met with coughs in the latter weeks of pregnancy, which proved rebellious against all treatment, until the delivery of the patient; after which they yielded to the common means of cure: the pressure of the womb on the abdominal vessels being removed, the pulmonary engorgement and hyperæmic irritation previously sustained and reinforced thereby proved no longer indomitable.

The same pressure of the enlarged womb, above spoken of, interrupts the return of the venous blood from the extremities, and the transit of the contents of the lymphatic absorbents. Hence, when that pressure has reached its maximum, the feet and legs become œdematous, or anasarcous; the veins of the feet and legs acquire an enormous size, become permanently varicose, and in certain instances burst, so as to cause effusions of blood to take place. In like manner, as has been stated of the superior or arterial engorgements, this inferior or venous engorgement ceases upon the abstraction of its cause; limbs, when swelled even enormously, are observed to recover their natural size in three or four days after the accouchement.

That worthy old author, M. Puzos, whose *Traité des Accouchemens* was published in 1755, gives, at page 84, a sensible account of the causation of this œdema gravidarum: "On sçait que cette enflure ne vient que de la difficulté que les liqueurs ont à remonter de bas en haut, et à entrer dans le ventre; parceque le poids de l'enfant se fait bien plus sentir lorsque la femme est deboût que couchée, et s'oppose plus fortement au retour de la lymphe, dans cette situation, que lorsqu'elle est horizontale."

Puzos, it is true, makes a just discrimination betwixt this accident in Midwifery and a true dropsy; but the Student will be misled, should he not be convinced that the vast majority of the cases of infiltration, no matter how extensive, are owing to pressure on veins and absorbents, and not to a true hydropic diathesis. This accidental dropsy from mechanical obstruction requires no treatment by drugs. Puzos's explanation as to position ought to be remembered, and a confident expectation should be indulged as to a cure, a spontaneous cure, as soon as the obstructing cause shall have been removed, by the birth of the child.

Women sometimes grow apparently very fat in the last weeks or days of pregnancy; but the appearance of embonpoint is false—the delusion arising from an insensible watery infiltration of the whole of the superficial cellular tela: instead of increasing her embonpoint, she is really losing flesh by the constant waste of the elements of her blood, and when she comes to her lying-in she complains, a few days afterwards, of growing thin, whereas she may be in reality growing fatter. The deception consists in the elimination of the water of infiltration, which lets her contour down to the true state and expression of her real embonpoint.

Hydatid Degeneration of the Ovum.—A woman who has conceived in the womb, and in whom the pregnancy may have gone on for several weeks, or even for some months in the most regular and orderly manner, is nevertheless liable to subsequent faulty progress in the development of the ovum. For example, the whole mass of the placenta may become the seat of an hydatid degeneration. Hydatids are transparent vesicles or bullæ, colorless, and distended with water resembling pure water. They are supposed by many authors to be independent animals, and were by Laennec denominated as the cysticercus. Mr. Milne Edwards, in his *Elémens de Zoologie—Animaux sans Vertèbres*, speaks of them as belonging to the class of the Helminths or Entozoars. Under the order Cystoid Helminths, genus Hydatina, he says: "Finally, the Hydatids are generally considered as the last link in the series of intestinal worms; but the bodies described under this title are perhaps not real animals, and seem rather to be mere pathological products."

M. Pouchet, also, in his *Zoologie Classique*, p. 537, tom. ii., says:—

" It sometimes happens that women, affected with all the symptoms of pregnancy, discharge a considerable quantity of delicate vesicles filled with an aqueous liquor, that are perfectly analogous to the cysticercus, and that have hitherto been regarded as hydatids. The vesicles seem to adhere by a pedicle to the organ that produces them. Bremser looks upon them as helminths, and says they are really endowed with individual life, and constitute a peculiar species of animals. But several French physicians do not partake of this opinion of the celebrated German helminthologist, and think that these pretended entozoars are commonly nothing more than a pathological degeneration of the product of conception. Such are the opinions of Messrs. Désormeaux, Velpeau, and Orfila, &c."

I have translated the above passages from Milne Edwards, and Pouchet, in order to confirm the opinion I have to express as to the pathological and accidental nature of the placental hydatids. I am inclined to regard them as depending upon an hydropic state of the villi of the chorion, which, by a process of endosmose, under some maladive condition of the life-force of the ovum, is able to convert them into cysts, to the ruin of the product of the fecundation.

When a villous chorion begins to be generally subject of this hydatid generation, it is to be deemed that the embryo must necessarily perish in consequence of the destruction of its branchial organ, the placenta, which, after all, is nothing more than a cellulo-vascular process from the chorion. I have seen many examples in which the placenta, at healthful term, has exhibited several of these hydatid-vesicles without harm to the fœtus—while in others, the embryo has been prematurely discharged, accompanied with the debris of a placenta filled with innumerable small bullæ resembling white grapes in bunches.

Let the Student observe that the ovum, when invaded and conquered by this attack, continues to augment in size, its progress being governed by no ascertained law of rate. The healthy ovum has an exact rate—it is finished in nine months; but the hydatid has no certain rate—it compels the womb to distend for its accommodation, and that at a rate which is uncertain. I have seen a young woman, at the fourth month after conception, as large as she ought to have been at the sixth month. It is easy to infer that such a rapid deploying of the womb, one so different from the gentle and lawful rate of a true pregnancy, must have the effects of a pathological, rather than those of a physiological force.

The term to which the development of placental hydatids may attain in any special case cannot be foreseen. The uterus may cease to tolerate their presence in the 3d, 4th, 5th, or even in the 7th month of gestation.

The signs by which they are known are either inferential or positive. We infer that the womb contains hydatids whenever we discover it to be increasing with preternatural rapidity; a rapidity that could not be predicated of twins, of polypus uteri, or any tumor. We know that the-case is one of hydatids whenever, upon Touching, we can find a softish mass in the cervix which bleeds upon being rudely pressed, and which discharges upon the finger or the napkin specimens of the aqueous vesicles.

As soon as the diagnosis is made, one is ready to take advantage of the commencement of any dilating pain, to provoke the earliest possible discharge of the hydatid mass. This may be done by introducing the index finger into the os uteri far enough to reach and break up the mass. It mostly happens here, as it does in turning out coagula from the womb, after labors, that, as soon as a portion, even a small one, is broken off and discharged, the uterus begins at once to contract upon its now lessened contents, so that, in general, the whole product rushes forth from the violently contracting organ. When, upon the discharge of a quantity of the hydatid mass, the labor-pain ceases too soon, it is well again to break in pieces the rest, so that, when the pain next comes on, there may be less resistance to its expulsion. The Touch reveals to us the truth at last, as to whether all the product is driven off or not.

In any case where it might be desirable to expedite the expulsion, resort should be had to a colpeurynter.

I have observed that, in the course of a labor for the expulsion of hydatids, the hemorrhage is occasionally most violent, and even alarming. The tampon constitutes an unobjectionable means of arresting such a too troublesome waste of the blood.

Intense constitutional irritation accompanies the hydatid pregnancy in those examples of it where the growth is violently rapid. The over-hasty development of the womb or matrix of the mass may be compared to a bursting process. I leave it to the ingenious Student to study out the problem of the amount of constitutional disorder and its signs, likely to be made manifest upon such sudden and preternatural impetuosity of the uterine growth.

Moles.—Moles are altered ova. In the case of a false pregnancy or Mola, as it is called, we are to presume the conception was normal, but that, upon some accidental failure of the development of the embryo or the secundines, the embryo perished and disappeared. In the mean time, by the operation of a principle of vitality communicated through the uterus, the mass continued to exist and to grow, until the womb, no longer tolerant of the foreign body, must commence a series of contractions, by force of which it is expelled. The mole, like the hydatid, is called a false conception. Neither of them is a false conception; but a true conception, changed afterwards by some accidental diseased action.

Physometra.—There is said to be a false pregnancy called physometra or wind-pregnancy. I have recorded my opinion as adverse to this pretended state, in my *Letters to the Class*, and in a note to *Chambon* on this subject at p. 372. I cannot conceive of a womb distended like a balloon with gas. Some of the reviews with which my *Letters* have been honored find fault with my recusancy as to Physometra and Hydrometra. I receive with the greatest respect, and even thankfully, the strictures that have appeared together with a certain flattering amount of commendation of that work. Notwithstanding the remarks of my critics, I feel constrained to maintain the opinions I there expressed, to which I beg leave to refer the Student.

Authorities, however respectable, are after all to be regarded only as so many men or women. Authorities are not always lawgivers, but if they were, I must confess that I owe obedience to the higher law of my own perception.

The curious on this matter of Physometra may consult p. 605 of *Schenck's Obs. Med. rariores.* Fol. Lugd. 1644.

Hydrometra.—This is a state in which the womb becomes filled with water. The woman, supposing herself pregnant, suddenly finds herself deluged with water that, as is pretended, gushes in a torrent from the uterus, whereupon the signs of the pregnancy vanish away. Inasmuch as I cannot imagine the state of hydrometra, independent of some enormous sac, cell, vesicle, or acephalocyst in which it is contained, and as the supposition of such vast cells is impossible, I adhere to the opinion that Hydrometra is an hypothesis merely. I prefer to suppose the case to be one of over-distended bladder, and the water of the supposed hydrometra to be urine. If the womb should become affected with atresia of the os tincæ or cervix, and it should then fill with a great quantity of fluid, that fluid could not be water. I respectfully, therefore, claim to adhere to the dissenting opinions expressed in my *Letters*, to which again I refer the Student.

Abortion.—The ovum, however well protected by its recondite situation against the operation of any extrinsic causes of destruction, is, nevertheless, obnoxious to several influences that may cause its miscarriage. There are also many intrinsic causes that tend to effect its death; for, since the embryo is composed of a structure, and has functions that are vastly complicated and mutually dependent, it must be liable to disorders that may interrupt its growth, or health, and at last cause it to be thrown off as an abortion.

The embryo is so delicately organized, that very slight changes in the solids or fluids which compose it are sufficient to determine its destruction.

Its blood, out of which all its tissues are composed, is moved by its own powers of circulation, and it must, like all other living beings, be subject to engorgements, inflammations, hemorrhages, and all the other maladies that consist in derangements of the circulation.

Such a creature might perish from very slight faults in the power of the omphalo-mesenteric vessels, or the umbilical vessels—and unequable development of its more important internal organs doubtless serve, in many instances, to deprive it of vitality. Of the vast number of cases of early abortion, I presume a large majority depend upon disorders of the embryo itself, and not upon disorders or accidents happening to the mother.

While this is probably true, it is to be observed that the union of the placenta to the surface of the womb is so slight, that it is easily peeled off; so that a blow upon the region of the womb may destroy its connection, and blood become, at once, effused betwixt the placenta and the uterus; if a great quantity be effused, the whole surface of the placenta may be speedily detached or loosened, and of course, the ovum, now deprived of the sources of growth, must perish.

A sudden and very violent excitement of the bloodvessels, as by surprise, anger, &c., may cause the effusion of blood from the placental superficies of the womb. A contraction of the womb may break the connection. A violent concussion of the body, as by falls, jumping or rude motion in carriages or on horseback, may cause a detachment to take place; or the membranes of the ovum may be so weak and delicate as to burst upon very slight compression of the womb, as in coughing, straining at stool—upon any sudden and powerful exertion, as pulling, lifting, &c. Thus it appears that the abortion may be caused by the death of the embryo; by disease of the secundines; by sudden violent movements of the blood, causing the effusion of that fluid behind the placenta; by direct violence, or by the discharge of the water of the amnion.

If the ovum be ruptured, there is a discharge of water from the vagina, the quantity of which will depend upon the age of the embryo. This is sooner or later followed by pain, and flowing of blood. The pains, which are uterine contractions, become more and more frequent and considerable, until the ovum or its remains are expelled, when the bleeding begins to diminish, and, for the most part, the pain returns no more. If any cause should have been applied that could detach a portion of the placenta without rupturing the ovum, many hours, or even several days might elapse, before the blood that follows the detachment should appear at the orifice of the vagina: the blood must first force its way betwixt the chorion, and the internal surface of the womb; but as soon as it reaches the orifice, it falls into the vagina, and then there is what is called a *show*. If the fœtus perishes by an internal disease, or in consequence of some disorder that happens to seize upon any part of the ovum, the further development of that ovum, or of the embryo, ceases, and it is cast out by the contractions of the womb, sooner or later, according to circumstances. For the most part, the ovum, soon after it has lost its vitality, becomes an irritant or excitant of the womb. On not a few occasions, however, the dead ovum remains within the uterine cavity for weeks or even for months, without exciting its contractility—cases that are among the most embarrassing, on account of the diagnosis, that the obstetrician can possibly encounter. The dead ovum of three months may not be expelled until the seventh or eighth month of pregnancy. It undergoes no putrefaction, unless the membranes have been ruptured; in which case, it cannot remain very long undischarged.

There are some individuals in whom there seems to be so great an irritability of the muscular fibres of the womb, that the presence of the fruit of a conception never fails to bring on the contractions before the completion of the term of pregnancy; and I apprehend that this excessive irritability is among the common causes that produce abortions. This view seems to be maintained by a reference to what happens in those who have already miscarried, since such females are found to be greatly disposed to miscarry again, at about the same period as that at which they had sustained the first misfortune; which appears to me to indicate that the repeated accidents of this kind are attributable, rather to an excessive or abnormal irritability of the womb, than to any of the other circumstances that are enumerated as causative of abortions; for it is far more reasonable to suppose that the *same* uterus is endowed with too great a degree of muscular irritability, than to suppose that several successive germs should be so constituted as to perish always at about the *same* period.

A woman becomes pregnant by the fecundation and subsequent fixation of a deposited ovulum. The act of fecundation can only take place after the ovi-posit has happened. The conception does not necessarily put a stop to the periodical development of ovarian ova—nor to their maturation and fall. But a woman who menstruates because of her ovi-posit, will tend to menstruate at regular periods, though she may have already conceived in the womb. Some women have this tendency so strongly, that they do actually menstruate during the earlier months of their gestation. Mrs. K. menstruated until the eighth month of her pregnancy.

Every woman who menstruates in her pregnancy is trying to miscarry; and she would miscarry if the monthly hyperæmia, giving rise to menstrual hemorrhage, should cause the outflowing blood to destroy the connection between the ovum and womb. If she does not miscarry in such cases, it is because the blood escapes from the uterine superficies below the surfaces occupied by the ovum in the cavity of the organ, or because the connection of the ovum to the womb had become a sufficient bar to the discharge of blood from its uterine vessels.

The above may serve as an explanation of the very common opinion that a woman is most liable to abortion at periods coinciding with the menstrual effort, and there is good reason to believe that a great number of abortions do take place at those conjunctures. It is reasonable to suppose that the periodical hyperæmia of the reproductive organs that causes menstruation would, should it occur in pregnancy, expose the woman to the risk of miscarriage—and it is equally reasonable to take especial precautions against such an occurrence for those women who have, on former occasions, suffered the loss of the ovum, at or near to the menstrual periods, and without any other assignable cause than the menstrual effort.

Whenever, in abortion, the contents of the gravid womb come to be expelled from its cavity, that expulsion is effected by a real labor, often severely painful, and requiring for its completion many hours of greater or less suffering; sometimes many days.

I have had the medical charge of the same women in regular labor and in abortion; and they have informed me that, for acuteness and severity of pain, the abortion has far exceeded the labor at term. This is not always, nor perhaps most generally, the case. The reason why some women suffer so acutely in miscarriages is, that the canal of the cervix uteri requires for its dilatation, in the early months, a great deal of power to be employed in forcing the embryo, which at that time is contained in the cavity of the body and fundus, down through the long narrow canal of the cervix uteri; and the distress produced by this dilatation of a long and rigid canal must often be as great, and might *à priori* be supposed as great, as that occasioned by the dilatation of the os uteri at term, which in the last days of pregnancy has become thin and yielding; whereas, in the early months, the whole cervix, as well as the os uteri, is of an almost cartilaginous hardness and rigidity.

At the beginning of the effort to miscarry, the womb is shaped like Figure 69. The egg lies in the cavity made out of the expanded *corpus et fundus*; but, before the ovum can be expelled, the long cylindrical neck must first be converted into a cone, like Fig. 70. But, after the cervix has been altered in shape, so as to become a cone, the ovum cannot escape until by a further process of dilatation that cone is turned into a wide open cylinder, whereupon the ovum is thrust forth and falls into the vagina, as in Fig. 71.

Fig. 69.

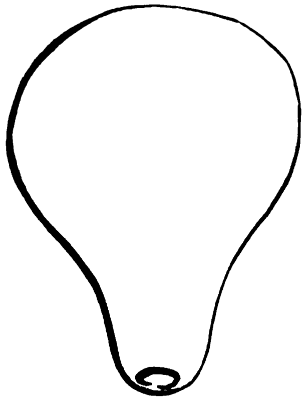


Fig. 70.

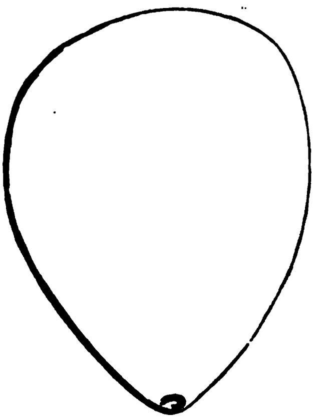
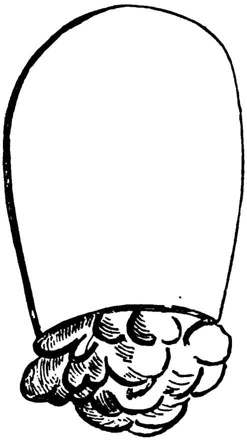


Fig. 71.



Abortions sometimes take place very easily, with little pain, and almost without hemorrhage; but the quantity of blood lost in some instances of miscarriage is enormous; probably on account of the extreme degree of uterine irritation or sanguine molimen which the act of abortion develops. The hemorrhage is apt to continue until the contents of the womb are expelled; and it is, therefore, highly important to expedite that occurrence by all reasonable means. Unfortunately, these means are few.

Upon taking charge of a case of abortion, it is the student's duty to ascertain which of two indications he ought to pursue. First, he should decide whether he will attempt to save the pregnancy, by preserving the vitality of the ovum; and second, he should determine whether any moral probability now exists of the death of the ovum. In the latter case, it may demand his respect no longer; in the former, he will act against duty if he fails to do whatever may hopefully tend to the conservation of the fruit of the womb. The quantity of blood lost already may serve in some degree to enable him to decide both these questions; for, if the pregnancy be not much advanced, the loss of a considerable quantity of blood is evidence of so incurable a detachment of the fixed ovum as to preclude any reasonable expectation of its continuing to live in the womb.

Besides his inquiries and observation as to the quantity and force of the hemorrhage, he should carefully ascertain by touching the existing condition of the os and cervix uteri. Therefore, whenever the flow becomes so considerable as to affect the pulse and the complexion of the patient, it is imperatively required that the medical man should ask for an examination per vaginam; and he will sometimes find that the ovum is sticking in the cervix, and needs only a little aid to escape from it—but, while it remains, it cannot but keep up the hemorrhage. The fore-finger may, in such instances, be pushed as far as practicable within the canal of the cervix, alongside of the ovum, and then bent so as to resemble a blunt crotchet. By the aid of the finger, used in this way, and the assistance of powerful bearing down on the part of the woman, the offending cause is without much difficulty removed, and the effect ceases. When the finger cannot be employed, Dr. Dewees's placenta-hook may be employed.

I annex a figure (Fig. 72) of Dr. Dewees's placenta hook or crotchet, which is on some occasions a convenient instrument for pulling down the ovum when merely held by the cylindrical grasp of the cervix.

Fig. 72.

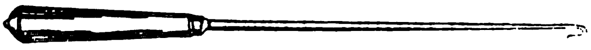
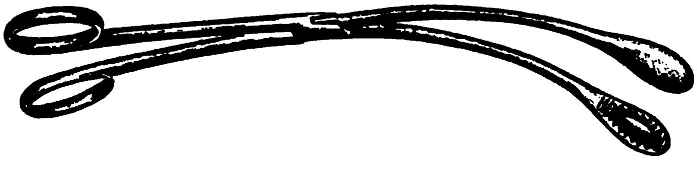


Fig. 73.



Dr. Henry Bond, an eminent practitioner of this city, has proposed a placenta forceps for the delivery of the secundines in abortion, of which Fig. 73 is a representation.

Dr. Bond's instrument is ten inches in length, and so rounded that it is difficult to conceive of an operator awkward enough to pinch with it any of the parts of the mother. An inspection of the drawing suffices, without further explanation, to give an idea of its usefulness.

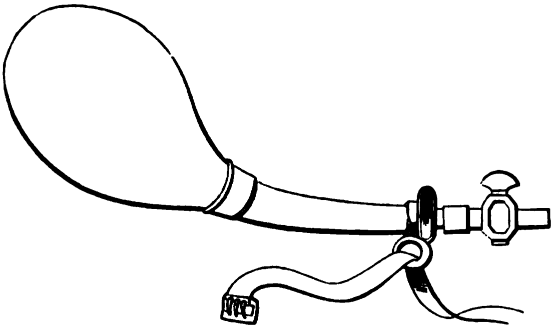
While I lay before the Student these instruments for the extraction of the dead ovum, I ought to warn him against too facile a disposition as to the employment of them, and to assure him they will often disappoint his expectations, and sometimes, where they do succeed, lead to evil consequences as to the mother. The ovum, in abortions, inhabits the body and fundus uteri. The cervix stands guardian as *facultas retentrix* over the deposit, and reluctantly yields it a passage. In doing so, the conical neck of the womb must become a cylindrical canal, into which the fundus and corpus uteri thrust their intolerable burden. When this cylindrical canal hath received into its calibre a small ovum, or the remains of one, it has, of itself, little or no power of expulsion, but merely grasps the ovum and holds it fast. It holds it sometimes for many days. I have found it to hold the ovum in this manner for many consecutive days, because the very os uteri would not let it escape, failing to yield, chiefly perhaps because no dilating pressure was applied. In the long run it yields, the os tincæ becoming wide open, and then a bearing-down effort, a fit of coughing, or straining at stool or urine, drives it forth into the vagina. (*Vide* Fig. 71.) Now, until the canal has become truly cylindrical, Dr. Bond's forceps and Dr. Dewees's hook are not to be employed without much care and gentleness. For the most part, it is better to wait until all is prepared, and then remove the object with the index finger.

In those cases in which a proper attempt to extract the debris of the ovum has failed, those who like the support of high authority may console themselves by referring to Puzos, who at page 193 says that "cette terminaison est bien moins effrayante; mais elle est bien plus longue; j'ai vu de ces fontes durer six semaines à deux mois; et pendant tout le temps, où les vuidanges sont si fœtides, j'ai vu ces femmes tourmentées de fièvres irrégulières de dégoûts et d'inquiétudes." He thinks these cases ought to be left to nature.

If, upon making examination in abortions, the state of the cervix is found to be unfavorable to the speedy expulsion of the offending cause, and the hemorrhage be not too threatening, recourse may be had to the application of napkins, wrung out of cold vinegar and water, to the hypogastrium and pudenda; to the administration of dilute aromatic sulphuric acid; to the acetate of lead, with opium; or to the preparations of secale cornutum—as the powder, in doses of five to ten grains repeated *pro re natâ*, or its vinous tincture, of which a teaspoonful may be given every half hour, or at intervals of one or more hours, according as the events of the case seem to demand. A powder consisting of five grains of alum and one grain of nutmeg may be given as a hemostatic every half hour or hour. The lancet may be resorted to, to aid both in diminishing the hemorrhagic nisus and in favoring the dilatation of the cervix, to which nothing contributes more powerfully than venesection. This, however, should be used with great and good discrimination.

Colpeurysis is a process or method of treatment used in certain sexual disorders, the employment of which is daily becoming more general in Europe and America. The instrument by which colpeurysis is effected was proposed and introduced into practice by Dr. Carl Braun, assistant physician at the Lying-in Clinic at Vienna. An account of the matter is contained in a work in three parts entitled *Klinik der Geburtshilfe und Gynækologie*, published in the course of the years 1852 to 1855, by Messrs. Chiari, Spaeth and Braun. In part I. p. 126, is an article on colpeurysis by Dr. Braun, with a figure of Braun's colpeurynter, of which I annex a copy, Fig. 74. Colpeurysis is from the Greek κολπος and ευρυνω. The compound word is intended to express the idea of vagina and dilater. Previously to Dr. Braun, physicians and surgeons were accustomed to the use of various methods of dilating the vagina or the cervix uteri, such as sponge tent, the tampon, &c., but the apparatus delineated in Fig. 74 is found so convenient that it will doubtless become much in vogue in practice. The colpeurynter is a vulcanized gum-elastic bag fitted into a small hollow cone of horn. There is fitted to the apparatus a ring for holding a strap and buckle which serves to secure it from falling away when duly adjusted. There is also a stopcock, as seen in the drawing. The vulcanized rubber bag when empty may be introduced into the vagina, and then filled

Fig. 74.



with air or tepid or cold water in quantity sufficient to distend the bag at discretion, so that the walls of the vagina may be made to expand as much as they do when distended by the fœtal head in labor. This colpeurysis may be carried on so slowly and gently as to give no distressing pain, and if it be continued for a certain length of time it inevitably causes the neck of the womb to dilate. Hence it is a neck dilater as well as a vagina dilater, and is used daily for hastening the dilatation in abortions, in hemorrhagic labor, and other cases in which it is desirable to precipitate the delivery of the woman.

This colpeurynter makes a very good tampon, and possesses the great advantage of being employed warm or cold, as it may be distended with water of any desirable temperature. I have used it as a tampon in placenta prævia in a case that required speedy dilatation to enable me to turn and deliver by the feet, and I have used it in various other states of the female genitalia which I propose to speak of on the proper occasion; for the present I mention its use as both a tampon and dilater very appropriate in abortion cases. The Student doubtless understands that if the vagina should be very much distended with a colpeurynter, the cervix uteri must sooner or later yield to the force, or be pulled open by the upper end of the vagina which arises from the whole outer circumference of the neck.

Tampon.—But among the various means of putting an end to troublesome hemorrhage, I ought to name the tampon, or plug. This tampon may be composed of a sponge; or, what is far better, of pieces of cotton or linen cloth or patent lint, torn into squares of from two to three inches, which may be pressed into the vagina, one at a time, until the entire canal is filled and distended with them. They should be kept there by a napkin, worn as for the menstrua, or by pressure with the hand of a nurse, a napkin being interposed, until the flow is effectually checked, at least. The tampon may be allowed to remain *in situ* from six to twelve, or even twenty-four hours in winter. When removed, it is generally followed by the ovum or its remains, which are frequently found attached by a coagulum to the upper part of the tampon. Should any dysury be caused by its presence, the bladder may be readily relieved by the catheter while the woman preserves a horizontal posture, which should never give place to a vertical one until all probability of a return of the hemorrhage has disappeared.

I do not understand how a woman can be permitted to die with hemorrhage, in an abortion, while a colpeurynter or the materials for a tampon are at hand, since the discharge may always be effectually controlled. The remedy gives no pain, if properly used; and, so far as my experience of its employment bears me out, it never causes any considerable inconvenience; while, I may add, it always succeeds.

A good many cases of abortion, in the early stage, as from the sixth week to the tenth week, have fallen under my notice, in which the uterus was unable to expel the debris of the ovum, and in which I could not extract it. The female, in such instances, save one, has always recovered without the ovum having been visibly discharged; but there always was an excretion, continued for many days, of offensive dark-colored grumes and sanies, which I accounted for by supposing that the substances in the uterus had macerated, and came off in a state of semi-solution, as in the instances mentioned by Puzos. I think that there is no danger in leaving such occurrences in the hands of nature; and that it is better to do so than reiterate attempts to extract by force, that have already proved quite vain; especially, considering that there is as great danger of exciting inflammation by those attempts as could be anticipated from the gradual maceration of the ovum. Let the Student reflect upon the demonstration made by my Figures 69, 70, and 71, and he will perceive that an attempt to take away the ovum, before the womb has become changed from Fig. 70 to the form of Fig. 71, not only ought to fail, but must fail of success. I am not disposed to deny that the presence of a putrefying substance, even of a small size, in the womb, is capable of developing inflammation and fever; but it has not happened so in my cases, and I have advised the same course to some medical friends, by whom I have been consulted, without the least cause to regret having given such advice. Let me be clearly understood, however, to recommend that the last remainders of the ovum should be brought off, where it is practicable, by employing reasonable efforts to do so.

I shall not omit the present opportunity for repeating, with regard to the tampon, that it is not a proper remedy for those cases in which any hope is yet entertained of saving the pregnancy.

Let us suppose an instance in which the placental attachment has taken place at the fundus uteri; that a partial detachment of the placenta has occurred; and that the blood, having forced its way in a narrow stream or rivulet betwixt the womb and the outer surface of the ovum, has at length made its appearance at the pudenda. Nothing is more common than to see such cases of *show* suppressed by venesection, recumbency, an opiate, some doses of elixir of vitriol, or cold lemonade. Should any practitioner, anxious to promote the formation of a coagulum, and thereby stop the effusion of blood and save the pregnancy, have instant recourse to the tampon, what would be the consequence? The blood, instead of escaping externally, would be forced back on the ovum, while newly effused portions of it, instead of flowing by the route already formed, would continue to dissect off or separate the ovum more and more, until the whole of it should be detached, and at last come off, enveloped in the centre of a compressed clot. To use the tampon, therefore, is to insure the abortion; hence, it is only a remedy for the hemorrhage of abortion, and not a remedy for miscarriage, which it not only cannot prevent, but actually insures, or renders certain. The blood which continues to flow into the womb after the vagina has been closed by the tampon may be compared to a river dammed across its channel, whose waters, in consequence, overflow their banks, drowning the adjacent country.

With regard to the tampon, I wish to add that its employment in advanced stages of pregnancy, although allowable in certain instances, demands very great discrimination, inasmuch as it is capable of converting an open into a concealed hemorrhage, as we shall have occasion more fully to remark when we come to the consideration of uterine hemorrhage in labor. It may, under the proper indications, be with safety employed up to the close of the fifth month of gestation, since the womb, until that period, is incapable of admitting a sufficient quantity of blood to give any well-grounded fears of a fatal concealed hemorrhage. But at a later stage, the capacity of the uterus is so much increased that the tampon, if employed at all, ought only to be used while the practitioner himself carefully observes its effects, remaining at hand to remove it in case the uterine cavity should become distended and filled either with fluid or coagulated blood to a threatening amount. I was told, not long since, of an instance in which a gentleman, treating a case of hemorrhage after delivery, was pressingly called for to visit another woman in labor, and as he felt compelled to go, he tamponed the vagina with a handkerchief, by which he effectually suppressed the apparent hemorrhage, but upon returning shortly afterwards, he found the patient dead, the womb having filled with blood instead of expelling it from the vulva, just such a conclusion to the affair as ought to have been expected from the use of a tampon under such circumstances.

It has happened to me to see the tampon injudiciously employed in this way on several occasions. Two of the persons were nearly expiring, when I arrived and immediately removed them; and one other, for whom it had been applied early in a flooding labor, without placental implantation, was expiring when I reached the house—a dreadful case of mala praxis, to which I shall recur in a future page.

Prolapsus.—It is commonly thought that women who suffer under repeated abortions are quite as much, if not more subject to a consequent prolapsus uteri than those who are confined at full term. The natural tendency of labor is to produce a prolapsion of the womb, and that tendency must be much greatest where the vagina has been much distended and pressed out of its ordinary form. This might lead one to deny that abortions are as likely to bring on a state of prolapsus as labors at term. But those women who miscarry are, for the most part, not sick any longer than during the actual miscarriage: they generally get up, most imprudently, the next day, or in some instances even on the same day. The solid and weighty substance of the uterus now bears down the vagina, to whose upper extremity the organ is attached; and weakened and relaxed by the discharges of the miscarriage, and ofttimes after abortion affected with vaginitis, the vagina makes less resistance than is common, so that the womb takes permanently a lower level in the pelvis than it ought to have. All the difficulties and embarrassments likely to accrue from this vicious situation of the womb might be obviated by a little patience and prudence in the beginning. The woman should be warned, in clear intelligible language, that too early a getting up exposes her to the risk of suffering from a falling or bearing down of the womb, which may ruin her health, and thereby render her unhappy for life. Unfortunately, she feels too well to believe that our words are other than useless and needless vaticinations, and so she is not willing to maintain a recumbent posture more than one or two days.

It should be considered that while a woman, lying-in, is in a physiological state, one laboring under miscarriage is in an opposite condition—that she is sick, and often needs care not less sedulous than the other one requires. The womb is in fault, as to the miscarriage in some of the cases, and any man conversant with the events of our obstetric practice knows that the organ is occasionally left by abortions inflamed, or hyperæmic, and irritable to the last degree. In these instances, the organ is situated much as it is when affected with hypertrophy. Long-continued uterine tenesmus, sanguine affluxion, enfeebling discharges, and persistent pain, might well be expected to result in a descent or prolapsus, scarcely to be avoided by those who suffer frequent distressing abortions, and especially by those who pay not the least regard to the common sense dictates of the medical man.

Retroversion.—In proportion as pregnancy advances, the womb increases in longitudinal diameter; so that, if it should from any cause happen to be turned over backwards, the top of the fundus uteri would lodge in the hollow of the sacrum, while the os tincæ would be pressed upon the symphysis of the pubes, or above it.

There is no reason to doubt that the uterus is frequently turned over backwards, but not retained; for the urinary bladder, when very full of water, extends backwards and downwards, pushing the top of the womb along with it. If this happen to a woman about two and a half or three months gone with child, she will scarcely fail to have a serious retroversio uteri, which will probably continue until the organ is reposited by some skilful hand.

There are persons who bring on these uterine deviations by a habit of retaining the urine until the bladder becomes over-full. Such, at least, is the opinion I have formed from inquiries addressed to the patients themselves.

Some women, from a fastidious delicacy, or from circumstances of the society in which they pass their waking hours, fail to yield to the ordinary solicitations of nature as to the discharge of the urinary bladder, and allow it to become so distended that it equals the bulk of a pint or even a quart measure, before they take notice of it. So great a bulk as this occupying the space behind the lower portions of the abdominal muscles and betwixt them and the sacrum, cannot but put upon the stretch both of the ligamenta rotunda, which is equivalent to the effect of thrusting the fundus uteri down upon, and even below the promontory of the sacrum; but when the womb does turn over backwards, the cervix comes forwards by a see-saw motion of the organ, and this it cannot do without inordinately stretching the utero-sacral ligaments which are in this way, for many women, completely relaxed and ruined. Some women who have what is called retroflexion of the womb seem to have very sound and strong utero-sacral ligaments, which restrain the cervix from coming forwards to the pubis, as happens in ordinary retroversions. Can there be any doubt that such a habit, persisted in for years, would result in the state of retroversio uteri?

CASE.—I saw this day, July 12, 1848, a young lady of 22 years of age, who has been married now ten months. She presented all the external characteristics of fine health. She has never conceived. She has a constant pelvic pain, and has suffered for eight years with the most distressing dysmenorrhœa, informing me that she never had her catamenia without violent pain; yet the menstrua are abundant and regular. She uses a dozen napkins at each period, and sometimes more than a dozen. There is severe pain in coitû, which cannot be perfectly effected.

I found the os tincæ half an inch behind and below the crown of the pubal arch—though the fundus uteri occupied the recto-vaginal cul-de-sac. It was bent, with a short turn, backwards.

Upon causing her to turn over upon the face, I readily reposited the womb—but it came down again upon the least motion. When I pressed the index finger firmly on the lips of the os tincæ or on the cervix, she felt acute pain, and said the pain was the same in kind as that of her dysmenorrhœa. Her habit has always been to retain the urine long, so that sixteen or twenty ounces frequently collect before she discharges it. Now this person had never had any considerable illness, or met with any accident. Can there be any doubt that this habit is the cause of the retroversion? There is no other discoverable cause.

Suppose the fundus of a gravid uterus to be caught and detained under the promontory, as above mentioned, and that the child proceed in its growth, carrying with it the womb in which it is inclosed; the consequences must be a complete impaction of the womb into the excavation—a total prevention of the flow of urine from pressure on the urethra—a stoppage of the canal of the rectum—severe pressure upon the internal sacral foramina, with their nerves; and, unless by timely measures obviated, the certain and miserable death of the patient, as in the case related by me and illustrated by a plate in *American Journal;* for in the case examined by Dr. Hunter, so completely impacted or jammed was the womb into the cavity of the pelvis, that, after the death of the patient, it was found impracticable to get the uterus up out of the excavation, until the pubis was cut through with a saw, in order to admit of the enlargement of the brim of the pelvis. In my case, reported as above cited, the pubes were cut away to enable us to remove the uterus with its contents. It is difficult to conceive of a situation more frightful than that of a patient under such circumstances. The case, with the fine illustrative engraving, is contained in Hunter's Tables of the gravid womb.

My experience teaches me that most of the instances of retroversion are attributable to a distended bladder, whether after parturition or no. The modest delicacy of young women often compels them to resist the most urgent desire to pass off the urine. A female riding in a carriage, or placed in such a situation that she cannot withdraw from the company without being suspected of a desire to urinate, will allow the bladder to fill almost to bursting; and if she be pregnant about three months, she will scarcely fail to bring on retroversion of the womb. When at last she obtains an opportunity to evacuate the bladder, she finds she has a partial or total retention of urine. The usual recourse is had to spirits of nitre, to watermelon-seed or parsley-root tea, and perhaps a dose of castor oil may be resorted to; but as relief can only come by some mechanical remedy, the medical man is at length, and reluctantly, sent for.

CASE.—A few years ago, I was called to a young woman who had been a short time married. She arrived in town by one of the public conveyances from the eastward. She had a constant and irrepressible desire to urinate, and could only succeed in getting off a few drops at a time. She told me she was pregnant; had just arrived from a journey; and that she was suffering the most acute distress from the constant inclination to urinate. As the disorder had come on suddenly and in a state of high health, I at once told her she had a retroversion, the nature of which I explained to her, and she submitted to the necessary investigation; upon which I found her womb turned over, and upon repositing it she was immediately cured. I suppose that, in travelling, her bladder, for want of an opportunity to empty it, had become very much distended; that its bas-fond had pressed upon the anterior superior face of the womb more and more as it became more and more distended, until the fundus uteri, jammed under the promontory of the sacrum, could not get out again, without the aid of a physician.—See my *Letters to the Class, sub voce.* One of my critics condemns the rapidity of my diagnosis in the case. I respectfully refer him to the passages in which I explained that, by using the method of exclusion in the analysis of the symptoms, I could not possibly arrive at any other conclusion.

To see a healthy-looking woman seized with complete retention of urine, without having been before the subject of any urinary ailment, is always warrant enough for us to suspect a retroversion of the womb, especially if the patient be at the time pregnant, and not advanced beyond the fourth month. The symptoms of which such patients complain are either a total retention, a stillicidium, or a great dysury; with pains about the region of the pubis and sacrum; constant tenesmus, or bearing down, and a sense of obstruction or stoppage in the rectum.

No case like this ought to be suffered to pass without making an examination per vaginam. For this purpose, let the patient lie on her back, near the right side of the bed; the feet drawn up near to the breech; the head and shoulders raised with pillows. The physician should stand by the bedside, and with his left hand placed upon the hypogastrium, ascertain if the bladder be much distended: it will sometimes be felt almost as high up as the umbilicus. The forefinger of the right hand may next be carried into the vagina in order to seek for the os tincæ, which is to be found behind the symphysis pubis, or even thrust over and abovè it: the vagina seems to be obstructed by a hard body, which is the bas-fond of the womb, whose fundus is turned down into the hollow of the sacrum, and jammed into the cul-de-sac composed of the reflexion of the peritoneum, which lines the upper posterior third of the vagina and the front of the rectum.

Having thus verified the existence of a retroversion, the next steps required to be taken are those that are demanded for the repositing the womb. Among the most pressing indications of cure, is the relief of the suppression of urine, which in general is easily fulfilled by the introduction of the catheter. A long elastic male one is the best, because the womb, in changing its own position, carries up the neck of the bladder, and thus elongates the urethra so very considerably, that it will be found convenient to use a long instrument for the evacuation of the water.

Inasmuch as the most ordinary cause of retroversions is a distended bladder, it has been thought that the removal of this distension is the sufficient remedy, it being supposed that the uterus might recover its place as soon as the pressure which overset it should be taken off. Indeed, there are cases in which the restoration takes place soon after the bladder becomes emptied. I have related, in my *Letters on Woman, &c.*, cases of retroversion cured by the catheter alone, and one, from an English authority, in which a most dangerous case of retroversion, in pregnancy, which could not be cured by the hand, gave way to the use of the catheter, left for a long time in the bladder, by which means that organ was completely hindered from filling up, and obstructing the tendency of the fundus to rise upwards to its natural situation. It has well been contended that, for retroversion of the gravid womb, a sound discretion indicates the propriety of leaving the case in nature's care, after this preliminary measure has been accomplished, lest, by any rude or too persevering attempts to replace the uterus, the ovum might suffer so much injury as to bring on an abortion. I admit that I am not prepared to decide as to the necessity for such great prudence, since I have only on one occasion put it to the test. On that occasion, I drew off the urine two successive days, the accumulation being very great; and then, finding that the malposition was not rectified, I was compelled to replace the womb with my hand: no inconvenience whatever followed the operation, although the patient was near four months complete gone with child. In a subsequent pregnancy, the same person suffered a retroversion of the womb, nearly at the same period; and when I was called to see her, I immediately proceeded to restore it to the proper attitude. In this case also the pregnancy was not in the least interrupted.

Having succeeded in drawing off the water, the patient, if necessary, should have a copious enema, in order to unload the rectum, which, if replete with fecal matters, might offer considerable obstacles to the success of our attempt. In the next place, we ought to endeavor to raise the fundus, the patient lying on her left side, by pressing the bas-fond of the womb, which can be felt through the posterior wall of the vagina, upwards, with the fingers, so as to move the whole mass in a direction parallel with the axis of the brim. The cervix uteri is tied to the more anterior parts of the pelvis by the vagina and the vesico-vaginal septum, so that, if we carry the mass considerably upwards, it must be by tilting the fundus in that direction. Attempts of this kind will not always succeed. Where they fail, a finger may be passed into the rectum, the forefinger of the left hand if the woman is on her left side, and of the right hand if she be upon her back. Before the finger has passed very far, it meets with the fundus uteri, which presses upon the canal of the intestine; in this situation, we have far more power to move the womb than when the effort is made only from the vagina. Pushing gently and steadily upwards, we find the mass gradually to recede, until at length the fundus, liberated from its restraint, suddenly emerges, with a sort of jerk, from under the promontory, from which instant the woman is cured.

I have sometimes failed of success, until I placed the patient in a more favorable attitude; one in which she could not bear down, and thus oppose the success of my measures. I have directed that she should turn on her face, then draw her knees up under her until the thighs were in a vertical position, giving to the pelvis the highest possible elevation: the cheek was to be placed on the bed without pillows, and the point of the thorax was also to be touching the bed. Lying in this posture, the power of mere gravitation might suffice, in time, to unhitch the fundus uteri from beneath the promontory; since all tenesmus and bearing down are thus arrested. After waiting a short space, until the effects of the position were secured, I have pushed up the fundus very easily by acting either through the vagina or the rectum.

A pregnant woman, who has just recovered from a retroversion, ought to lie in bed two or three days, and should not, for a few days, be left more than six or eight hours without evacuating the bladder, either spontaneously or by the catheter; lest that organ, filling again, should unhappily a second time depress the fundus, and so cause us to lose all our trouble through want of a moderate precaution.

The gravid womb, doubtless, becomes, in four months and a half, too large to admit of the occurrence of retroversion: but the accident may occur at any period short of it; it may take place not only in the non-gravid, but in the virgin uterus.

Case.—On the 22d of February, 1828, I was called to visit Elizabeth B., aged about twenty years. She had complained for several months past of dragging pain in the left side of the abdomen, with a sense of weight and great uneasiness within the pelvis. She has menstruated regularly. For the last three weeks she has been persecuted with constantly repeated and painful desire to go on the stool, and with symptoms of strangury, or dysury, amounting often to stillicidium urinæ. After a careful inquiry into the history of her case, I informed her of the nature of my diagnosis; and she at length agreed to permit an examination by the Touch, as I assured her that I had no means of relief for her, if there were really a retroversion, short of the Touch. In this painful necessity she submitted, with a laudable unwillingness, to the operation, and it was with no little difficulty that I at length carried the finger beyond a remarkably strong hymen, into the vagina. The os uteri was found near the symphysis of the pubis, and the fundus was discovered overturned into the Douglass's cul-de-sac. After a long perseverance in endeavoring to raise the fundus, I was compelled to attempt it with the forefinger of the left hand passed into the rectum, by which method I pushed the uterus up; whereupon she immediately declared that she was fully relieved of the sense of weight and pain that had so long been tormenting her. She continued well from that moment. I consider this a case of considerable interest, inasmuch as it further proves the possibility of a long-continued retroversion of the womb in the non-gravid and virgin state of that organ. I have seen many such cases since 1828.

There are some persons to be met with, in whom retroversion takes place so readily, that the least exertion of strength brings it on. In a single individual, I am sure that I have been called on to restore it to its position twelve or fifteen different times. So great, in that case, is the tendency of the womb to turn over, that it has several times occurred, notwithstanding the presence in the vagina of a very large globe pessary, and I did never regard her as exempt from the probability of an attack, except when in a state of advanced pregnancy. I presume that, in her case, there was not only a great relaxation of the vagina and its connecting media, the recto-vaginal and vesico-vaginal septa, but there must also be supposed to exist a condition of the ligamenta rotunda et sacralia, which has allowed them to become elongated to such an extent, that the least pressure on the anterior face of the womb pushes it backwards and downwards. No one, I think, could suppose a case of retroversion without, at the same time, implying that the round ligaments, which pass from the angles of the organ out of the abdominal canal, and abdominal rings, are lengthened—and even stretched. A permanent elongation or laxity of those ligaments would add a great facility to the disposition to oversetting of the organ.

As there is reason to believe that there is a character of muscularity attached to the round ligaments, proceeding as they do from, and being composed of the same tissues as the womb, we may indulge, in any case, the hope that time, if not drugs and medicines, will bring them back to their natural tension and length, so as to obviate the evil propensity to the retroverted state of the uterus.

The accident of retroversion may be considered serious and dangerous just in proportion as it occurs at a more advanced period of pregnancy; for, according as the pregnancy is of an older date, is the necessity greater for a speedy reposition of the organ. I have, I think, pointed out sufficiently at length, the dangers to be apprehended from a retroversion continued until the whole mass becomes so impacted into the excavation, as to render its extrication, without abortion, impossible. As I have met, hitherto, with only two examples in which it was impossible to replace the gravid organ, I do not feel it incumbent upon me, at this time, to do more than refer to the severer methods of extricating the woman: these are, first, the artificial rupture of the amniotic sac, which, by allowing the water to escape, reduces the size of the womb so much as to enable the operator to succeed in restoring it to its proper position; or, lastly, the puncture of the womb itself, when it is found impossible to reposit or pass a bougie into the os uteri.

The Student ought early to become aware that some of these retroversions are rendered incurable by the formation of adhesive deposits, that tie the fundus uteri close down to the back part of the pelvis, and that as these adhesive bands cannot be approached with the bistoury, nor otherwise broken up, the womb is liable to remain in a state of permanent retroversion. M. Amussat mentions two such cases in his essay on retroversion, and I have met with three, two of which were verified by the necroscopy. I shall publish one case, as drawn up by Dr. Yardley, and illustrate it by a cut copied from a drawing by Mr. McIlvaine, who had the specimen before him, and which constitutes one of the most interesting preparations in the museum of the college. The following is the history of the case, as drawn up by Dr. Yardley himself, who allows me to publish it here.

CASE.—"Mrs. N——— became my patient in the spring of 1840. I visited her on account of a diarrhœa, which had continued for some time, and which was attended with distressing pain in the left side.

"A regulated diet, saline frictions of the skin, which was cold and dry, together with small doses of mass. hydrargyri, opium, and ipecacuanha, soon cured the diarrhœa; but as the pain in the side and other symptoms of disease still continued, I was induced to investigate the case more fully. I then learned that since her marriage, about three years previously, she had had two attacks of uterine hemorrhage, which were pronounced by her physician to be abortions, though nothing like an ovum had ever been detected, and he had never examined the state of the uterus.

"The first attack came on on New Year's day, 1838, after taking a very long walk, and though the hemorrhage was not profuse, it was attended by such excruciating pain in the side on being moved that it was necessary to bring her bed into the parlor, where she remained several weeks. The hemorrhage and pain gradually subsided, and by the 1st of June she appeared to have regained her usual health.

"The second attack took place April 12th, 1839, and came on suddenly when making some unusual exertion while engaged at her toilet. The pain was so severe as to cause fainting, and was attended by vomiting, diarrhœa, retention of urine, tenesmus, severe bearing-down efforts, and slight uterine hemorrhage. These symptoms were mitigated by general treatment, without resorting to the catheter, or making a vaginal examination. She was confined to her chamber nearly three months under this attack, and was still suffering from its effects when I was consulted in her case. Her menses were irregular; her bowels frequently disordered; she was unable to take her accustomed exercise on account of a bearing-down pain and distress in the pelvic region, which was increased by exertion of any kind. Her husband informed me that since her last attack, she had always suffered severely from sexual intercourse.

"I considered these symptoms sufficiently indicative of disease or displacement of the uterus to call for an examination of the state of the parts. I found the uterus low in the pelvis, hot and swollen, and so sensitive as to preclude further exploration. Rest in a recumbent position, bleeding, cupping over the sacrum, and general antiphlogistic treatment, in ten days produced so much relief that the patient declared herself better than she had been for more than a year. I then made a second examination, and found the engorgement, heat, and tenderness much diminished; but there was considerable prolapsus, and the uterus and vagina were morbidly sensitive.

"I was desirous that the patient should remain longer in the recumbent position, but the weather being warm, and confinement very irksome, I introduced a gilt-ring pessary, and sent her into the country.

"Mrs. N——— returned about the middle of September. She informed me that for three weeks after the introduction of the pessary, she felt unusually well; she was able to stand and walk without suffering, and the distress in the pelvic region was much mitigated; but about that time, when using considerable exertion, she felt the instrument move, and it continued to trouble her until it came away. After the displacement of the instrument, her old symptoms returned, though for a time she was better than before its introduction.

"After keeping the patient quiet a few days, I made another examination; all morbid sensibility of the parts had now subsided, so as to admit of a full exploration, and, for the first time, I detected in the hollow of the sacrum a round, hard body, with a deep indentation between it and the lower part of the neck of the uterus.

"It was difficult to decide whether this was a tumor, or the fundus of the uterus bent down in that position; but after a careful examination, I was disposed to regard it as the latter, though it was much lower and more prominent than I should have expected from the situation of the os tincæ, which was not more anterior than is usual in simple prolapsus of an equal degree.

"After pressing up the uterus as far as I could, I introduced a gilt-globe pessary under the fundus, hoping it would gradually restore the organ to its proper position, and that, if it came away, the patient could replace it herself, which was important, as these repeated examinations were very disagreeable to her.

"The globe pessary was retained but a short time, and as it caused considerable pain and uneasiness during its retention, the patient was unwilling to have it again introduced.

"At the suggestion of Professor Horner, of the University of Pennsylvania, I next placed the patient on her knees in the bed, with her head and shoulders as low as possible, and introduced an instrument into the rectum, under the fundus of the uterus, and, by that means, assisted by its own gravitation, endeavored to dislodge it from its position. In this manner, I succeeded in pressing the uterus up much higher than before, and after again introducing a ring pessary, I requested the patient to remain quiet for a few days. This ring kept its position two weeks, and was productive of much relief; but it then came away, and the unpleasant symptoms returned.

"This process of pressing up the uterus, and introducing a pessary, was repeated several times; and it was found that a ring pessary was the only kind that was of any advantage, for, while a ring retained its proper position, the patient was comparatively comfortable. This relief, from the use of a ring pessary, appears remarkable, when, after death, it was discovered in what manner the uterus was bound down to the rectum; there is, however, no doubt of the fact, and it may be explained, by supposing that the anterior wall of the rectum was pressed forward and upward, or the adhesions stretched.

"The difficulty of retaining the ring in its proper position, however, seemed to increase; rings of silver gilt, glass rings, ivory rings, rings of hard wood, such as ebony and lignum vitæ, and rings of gum elastic, were all tried, but the gilt rings were found much the best.

"Discouraged by my want of success in the treatment of the case, I sought further counsel, and Professor Hodge, of the University of Pennsylvania, saw her with me, July 10th, 1841. On examination, he readily detected a retroflection; a displacement of the uterus with which he was familiar, and which he calls a retort uterus, from the fact that the uterus is bent on itself in the form of a retort.

"He proposed the introduction and persevering use of a pessary of a peculiar form, which he has successfully used in many cases of the kind; I had an instrument made after his pattern, and introduced it; but it was not of the proper size, and caused considerable discomfort, which the patient attributed to the form of the instrument, and, to my regret, was unwilling to have another one of the kind used.

"During the following five years, she pretty much abandoned medical treatment, except that, whenever her sufferings became unusually severe, she applied to me, when, by pressing up the uterus and introducing a ring, she would be much relieved for a time. Several other physicians were consulted in the case, but nothing important or novel was suggested.

"Her symptoms gradually grew worse, and, in July, 1847, I visited her, and found her confined principally to her bed; she appeared slightly emaciated; her brilliant color was gone, and she suffered severely from sickness of the stomach. She informed me that, after passing her monthly period about three weeks, she had had a slight show, which had returned every few days for the last two weeks; making about nine weeks from her last regular monthly period. On making an examination, I found the uterus occupying the same position it had heretofore done, and somewhat larger than before, but apparently not larger than an ordinary unimpregnated adult uterus.

"I declined adopting any active treatment without assistance, and suggested Professor Meigs, of the Jefferson Medical College, who saw her, with me, on the 17th of July. Dr. Meigs was sanguine, after examining the state of the parts, that the uterus could be restored to its proper position, notwithstanding the length of time it had been displaced.

"He came next day, prepared with an instrument to press up the fundus of the uterus, and with some small gum-elastic bottles, of the kind recommended by Hervez de Chegoin, in the hope that by gradual pressure in this manner we might succeed in restoring the organ to its proper position.

"The patient complained of much pain when the doctor attempted to press up the uterus, though but moderate force was used. I filled the bottles with curled hair, which I found to answer admirably on account of its elasticity, and introduced one of them carefully between the perineum and the fundus of the uterus. It gave no pain, and was retained without inconvenience, and appeared as though it would fulfil the indication.

"I kept her in her bed a few days, after which she rode out occasionally, and once walked several squares.

"On the evening of the 5th of August, after using much more exertion than she had done for several months, the ball was forced away, and she was attacked with severe bearing-down efforts, so that it was a considerable time before she could be removed to her chamber. After she had been carried to her bed, I made an examination, and found the uterus at the os externum, and the bearing-down pains so severe as to threaten its expulsion from the vagina.

"After administering an anodyne enema, and in some measure tranquillizing her system, I succeeded in pressing the uterus up to its former position, and introduced the gum-elastic ball at her own request, as she said she felt safer and more comfortable while it was *in situ*.

"The patient was unable to leave her chamber, and seldom her bed, from this time; and she often passed whole days and nights in the most awkward positions, because the least motion increased the pain beyond endurance. Her stomach became so irritable that it was seldom anything would be retained in it even for a single hour. She became weak for want of nourishment. The most excruciating neuralgic pains pervaded every part of her abdomen, so as to preclude the possibility of any examination either externally or per vaginam; and, to increase the difficulty of diagnosis, she became tympanitic.

"The wise women of the neighborhood said she was in the family way; but of this we were not satisfied; and Dr. Meigs, who placed considerable reliance on the appearance of the nipple, examined her breasts carefully, and there was not the slightest change of the areola.

"An anodyne enema was administered every evening, but her nights were generally sleepless, and she gradually grew worse till the 19th of August, when I was obliged to leave the city for a few days. My friend Dr. Jewell attended her for me, and has furnished me with the following notes of the case:"—

"My first visit to Mrs. N. was made on Thursday, August 19th, at the request of my friend Dr. Yardley, who was to be absent from the city for several days.

"Her condition, when I saw her, was anemic; countenance thin, pale, and sallow, expressive of long-continued and wasting disease; pulse sharp and frequent; abdomen tympanitic and exceedingly tender to the touch; tongue clean and moist; stomach so exceedingly irritable as to reject all nourishment and medicine, craving only ice, which, however grateful for a moment, afforded no relief. All her suffering was directed to a most excruciating pain in the left iliac region, accompanied with extreme gastric distress, which symptoms had been in existence, and increasingly so, for several days.

"Fomentations of brandy and spices were applied to the abdomen, and various anti-emetics and sedatives were ineffectually tried for the vomiting.

"In the afternoon, the symptoms being more aggravated, twenty-five leeches were applied over the stomach, and an enema of forty drops of laudanum in a gill of warm flaxseed tea thrown into the rectum. In the course of the night, the gum-elastic ball pessary, which had been introduced by Dr. Yardley for the retroversion of the womb, came away during an effort to vomit, and was not replaced.

"*Friday*, 20*th*. Found her very weak and exhausted, with some slight relief from pain and vomiting; expressed herself to be easier, but dreaded the return of the severe suffering she had experienced the day before. Was troubled with flatulency and slight oppression at the præcordia. Directed the effervescing draught, with thin arrowroot, in small quantities, and to be frequently repeated. The fomentations to be continued as yesterday.

"In the afternoon, was sent for in haste—that Mrs. —— had convulsions. On my arrival at her bedside, I found her in a collapsed condition, insensible, extremities cold, pulse and breathing scarcely perceptible, and her whole appearance completely blanched. By the persevering help of stimulants and artificial heat, she gradually revived.

"I learned from the family that, previous to her insensibility, she had complained of an agonizing pain in her left side, and an increase of sickness at the stomach, and in a few moments after went into convulsions.

"So forcibly was I struck with her bloodless condition at this time, I remarked to her husband that she had all the appearance of one who had lost a great amount of blood from flooding.

"Being comfortably restored, before I left, I ordered her brandy and water; ice in small and repeated doses, with essence of beef; and to repeat the enema of laudanum and flaxseed tea if the pain returned, together with the following prescription in doses of twenty drops every hour:—

℞.—Solut. sulph. morph. ℥j;
Hoff. anod. liq. ʒij.

"During the three following days, the vomiting continued with very little abatement. Every attempt to administer nourishment or medicine was indomitably resisted by the stomach, with the exception of the brandy and the morphine solution. On each successive day an anodyne injection was given, to subdue the attacks of pain in the left side. Her pulse, in the mean time, was feeble and frequent, her countenance blanched, and her whole condition so much exhausted as to afford but slight hope of her recovery. On Tuesday, 24th, however, there was an apparent amendment in her case; her pulse began to react, she was able to retain a little nourishment, the vomiting had in a great degree subsided, and her expression was, 'I feel comfortable.' Her bowels not having been open for several days, I ordered her a turpentine enema, to which they responded readily, though not freely.

"Wednesday, Aug. 25th. Had passed an easy night, but without much sleep; upon the whole she had improved, was cheerful, had taken a cup of tea, and had eaten some calf's-foot jelly; the tenseness and tenderness of the abdomen had subsided. I could make considerable pressure without causing either pain or sickness, and for the first time I was able to detect a tumor in the left iliac region, upon which spot, however, she could not allow pressure without acute pain.

"I felt quite encouraged with her appearance and the improvement in her symptoms, as did also her friends. Feeble hope was given that she might be restored. She asked for a peach, which was allowed her, and I left her in good spirits.

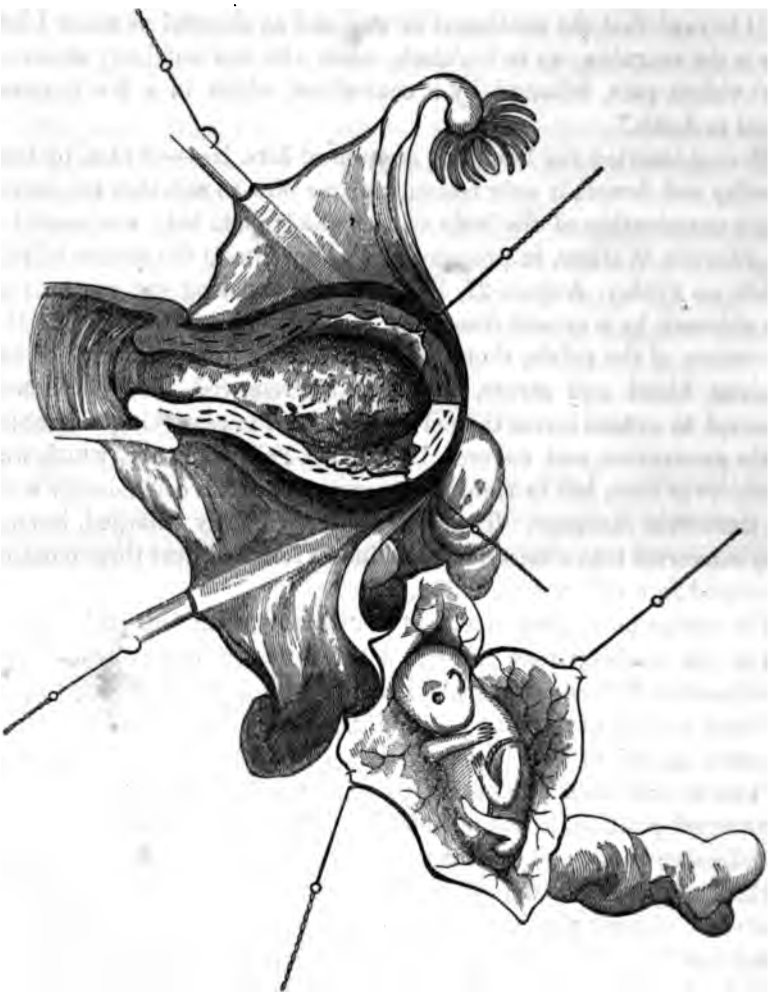
"It was near 3½ o'clock P. M., when I was summoned by a hasty messenger, that Mrs. —— was dying. On approaching her bedside, which was surrounded by weeping friends, I found her lifeless.

"I learned that she continued as well and as cheerful as when I left her in the morning, up to 3 o'clock, when she was suddenly attacked with violent pain, followed by a convulsion, which in a few minutes ended in death."

Having inserted the foregoing account of Mrs. N——'s case, by Drs. Yardley and Jewell, it only remains for me now to say, that the necroscopic examination of the body of this unfortunate lady was made by Dr. Ellerslie Wallace, in presence of Dr. Jewell and the author of this article, on Friday, August 27, 1847. Upon exposing the contents of the abdomen by a crucial dissection, and looking downwards into the excavation of the pelvis, there was discovered a great quantity of coagulated blood and serum, which being removed, the uterus was observed to extend across the pelvis from front to rear, lying horizontal in the excavation, and covered by the left Fallopian tube, which was turned over from left to right quite across the pelvis coincidently with the transverse diameter. The tube was enormously enlarged, having been converted into a sac which contained a fœtus of near three months, developed in a tubarian gestation.

The uterus being measured, was a little more than four inches long, and at the broadest part three and three-quarter inches wide. The child-bearing Fallopian tube could be lifted up from where it lay upon the front surface of the womb—no inflammatory attachment having as yet been formed to bind them together. Upon lifting the tube-sac off the uterus, and then attempting to raise the fundus uteri out of its retroverted position, it was not possible to succeed, in consequence of the adhesive bands and bridles that bound it to the lower part of the sacrum. When these adhesions had been divided by the scalpel, Dr. Wallace could lift the fundus out of its bed, and reposit the womb. This I had been unable to effect during Mrs. N——'s lifetime, either with the hand or with Hervez de Chegoin's caoutchouc pessary. I was not surprised to find the fundus glued in this manner to the lower part of the sacrum, for I had, in June, announced to Dr. Yardley my belief that it was adherent—an opinion founded upon the firm resistance of the tumor against all my attempts to reposit it. I may remark here, that I believe the womb might have been got out of its false and adherent position by means of the caoutchouc pessary, or by slow and cautious proceeding with colpeurysis, had not the tubal pregnancy unhappily supervened. I suppose that the adhesions might have been gradually broken or absorbed under the elevating power of M. Braun's method.

Fig. 75.



The rupture of the tube had occurred near its outer end, which, from its being turned over and laid upon the prostrate womb, was found nearer the right than the left ischium. Through the edges of laceration in the tube-sac, one of the feet of the embryon was protruding. The uterus and its appendages were removed, with consent of the friends.

Upon laying the uterus open, it was found to be filled with a deciduous mass and with bloody slime. The cavity was somewhat enlarged, but the paries of the uterus was very thick, like that of a uterus contracted after delivery. The tube was now laid over to the left, its natural position, and opened; whereupon it disclosed the embryon, as in the figure, which was taken by Mr. M'Ilvaine *ad vivum*. The deciduous membrane is seen in the cavity of the uterus, its edges being laid over on the cut surfaces.

I regard the case as an interesting one, from its showing the presence of its decidua in utero in a tubal pregnancy, and more especially as presenting an example of adherent retroversion; and, perhaps not less so, as exhibiting tubal pregnancy in a woman with adherent retroversio uteri. Since Dr. Braun's invention of the colpeurynter, described in a future page, I have used his instrument as a means of repositing the organ in the following case, and conceive that I have been the first person to make that application of it.

CASE.—In the month of June, 1856, a medical gentleman, practising in one of the interior towns of Pennsylvania, came to me to say that he had a case of retroversion in a woman, past four months pregnant, which he had in vain attempted to relieve. Nothing that he had done had in the least changed the posture of the womb, and he had accompanied his patient to the city for my advice and aid. On proceeding to the hotel, I took my colpeurynter with me, and found that I could barely reach the os uteri, by pushing the index finger as far as it could possibly be thrust upwards behind the symphysis pubis. I am sure the point of the finger was three and one-eighth inches within the orificium; so that, as the symphysis is but one inch and a half long, the os was situated very far above the top of the symphysis, and close behind the anterior abdominal paries. The pelvis was quite full of a fluctuating mass, which was the womb, distended with something, but whether with an ovum, I dare not now say. I prevailed upon the woman to lie on the back near the foot of the bed, with the limbs flexed, and, upon introducing and gently distending the colpeurynter, she complained of some uneasiness. In a short time, additional portions of water were thrown in, and I again desisted to let her rest. I soon afterwards allowed the sac to collapse, by letting the water escape into a bowl, and then repeated the injections, begging her to decide for me as to what amount she could, on trial, easily endure. It was not long before she, with a start, exclaimed: "What's that?" My reply was: "I suppose it is your cure;" and truly, on withdrawing the colpeurynter from the vagina, I found, to my great satisfaction, that the uterus was completely reposited, the os being in its true normal position, and the fundus, that had long been turned over into the recto-vaginal cul-de-sac, being now above the plane of the superior strait. The woman was so overjoyed with this entire relief, as to signify her happiness, by the wildest expressions of delight, to her husband, who stood by her couch.

I have made use of the colpeurysis in a great many cases of retroversion of the womb, and I am free to say that I cannot now conceive of any such case that would not readily admit of repositing by the colpeurynter, excepting always those cases in which adhesions have taken place, so as to confine the fundus low down in the cavity, and even in some of these, if the adhesions should not be very strong and old, repeated, gentle, and persevering colpeurysis might enable one either to elongate the adhesive bridles, or even break them, and force the fundus to rise up to its place.

Mr. Gemrig, surgeons' instrument maker, in Eighth Street, Philadelphia, prepares a most convenient colpeurynter. It consists of a vulcanized rubber bag, which, when collapsed, is not much bigger than a black walnut. To the sac is attached a hose, or tube, of the same material, about fourteen to eighteen inches long. A small brass stopcock is secured on the end of the hose, and fitted to receive the fistula of the syringe, by means of which water or air may be injected, and the bag distended at will. The great length of the hose permits one to use the apparatus in a way less shocking to the woman's delicacy, as the stopcock can be brought out from beneath the bedclothes, and the sac filled and emptied by turns.

In my practice, I am in the habit of teaching the patient to perform the colpeurysis with her own hands, first showing her how to adjust the colpeurynter, and then teaching her how to force the air or the water into the caoutchouc. This I have done for such persons as, having a chronic retroversion with considerable hypertrophy, I did not choose to attempt to cure by one violent operation; and I do believe, that in the bad cases, it would be, in general, for the interest of the sick woman to first teach, and then trust her as to the mode and degree of the colpeurysis.

I am very glad to have an opportunity to recommend the employment of the colpeurynter for the treatment of retroversion, particularly as such an application of the instrument appears to have wholly escaped the attention of its author, Dr. Braun, who, at p. 126, *op cit.*, gives us a list of the affections for which he advises its employment, and which consist in cases No. 1. Metrorrhagia during dilatation of the cervix in labor; 2, bad presentations, as preparation for turning; 3, deformed pelvis; 4, bringing on, or hastening labor in eclampsia;

5, for sustaining the parts in hernia intestino-vaginalis in pregnant women; 6, bringing on premature labor; and 7, as a substitute for the dangerous action of secale in the dilatative stages of parturition.

It appears to me unnecessary here to add anything on the subject of Braun's most useful instrument. I shall in subsequent pages have to speak of its various other applicabilities.

I have met with three cases of extra-uterine pregnancy in the tube, all of which proved fatal about the third month, and I should expect the death of the patient to take place, at or before the third month, in any case; since it is improbable that the tube can ever furnish the material for a matrix for more than some ninety days, at which time the tube-sac must become so much thinned and extenuated by its expansion as to burst. The rupture of the tube will be attended with fatal hemorrhage, because, being the seat of gestation, it has become highly vascular, in order to the carrying on of the gestation within its walls. I do not believe that a tubal pregnancy will ever be suspected until it has burst and begun to bleed. One of these cases I have just related, as drawn up by Dr. Yardley, under the head of retroversion.

If a woman should experience the signs of pregnancy, as to change of the aureole, as to nausea, pica and malacia, as to growth of the breasts, extraordinary sensation within the pelvis, &c., and thereupon, when having attained to the middle of the second or to the third month, be seized with horrible pain in the hypogastrium and pelvis, turn pale, lose the pulse, and faint—I should suspect the rupture of a tube-sac of extra-uterine pregnancy. It is true that the above symptoms might be expressions of affections of the ureter, perforation of the bowel, or fatal typhlitis calculosa; but, in case they should continue and increase, with signs of concealed hemorrhage, so as to leave no doubt of imminent death, I think the diagnosis could not be other than a ruptured tube-sac of gestation.

Such a diagnosis would not lead to any hopeful therapeutic or chirurgical intervention, for nothing is to be done in these melancholy cases beyond the adoption of mere palliative measures. No man would be mad enough, under such diagnostic, to perform a gastrotomy operation.

CASE.—I had, some years ago, a young woman under my care who supposed herself to be pregnant some two or three months. One morning she took the broom to sweep her chamber-carpet, when suddenly she felt agonizing pain in the left iliac and pelvic region, which extended through the belly. She fainted, and became mortal pale and pulseless; the agony was terrible. I supposed she had ruptured the sac of a tubal pregnancy. She expired in the course of a few hours, with all the symptoms of hemorrhage in the abdomen. I could not obtain permission to examine the body.

CASE.—I saw another case, which I shall relate in this place as follows:—

Mrs. ———, aged thirty-two, a healthy woman, mother of four children, was in excellent health on Sunday, October 7th. At six o'clock in the morning, she was singing and playing with her children. At seven o'clock, her husband, who was sick up stairs, heard her ascending the staircase, and groaning heavily; when she entered his room, she appeared alarmingly ill. A physician, Dr. ——, was sent for, and found her with a pulse one hundred and forty; in violent pain, extending from the top of the thorax on the right side, quite down to the iliac region. He attended her all day, applied a blister to the right side of the belly, gave a cathartic, &c. She passed a dreadful night, but was easier at eight o'clock next morning; the pulse then one hundred and twenty. He left her for a short time, but found her worse on returning to the house. I was sent for, and arrived at half past two o'clock. She appeared to be dying at the time of my arrival. As she had vomited very much, and had a most excessive tympany, with violent pain in the whole belly, she got an enema, which brought off a great deal of stercoraceous matter, without sensible relief. In half an hour, she said: "Raise me up—my breath is leaving me." I raised her a little on the pillows, and she swooned and died. Twenty hours after death, I opened the abdomen, and found it filled with about thirty ounces of blood, and bloody serum. The whole pelvis was filled with coagula, while a great quantity of blood was among the bowels.

This blood came from a ruptured left Fallopian tube, which contained a fœtus of six or seven weeks. The ovarium was somewhat enlarged. The womb had a deciduous lining, and the canal of the cervix was filled with a claret-colored mucus or lymph. The womb was larger than a non-gravid womb, though not a great deal larger.

I have had under my care only one case of ventral or abdominal pregnancy, though I have had opportunities to witness the examination of bodies of persons perishing from this dreadful accident. I shall merely express some doubt that I feel as to the propriety of any gastrotomy operations in such cases save mere incisions for the easier escape of the contents of the suppurating sac and the remains of the fœtus.

I refer the Student to the records for samples of life not only continued long after the complete establishment of the extra-uterine pregnancy, but of good health enjoyed notwithstanding. The late distinguished incumbent of the chair of Midwifery in the University of Pennsylvania, Prof. James, published in the *Eclectic Repertory* an account of a lady who carried out a normal pregnancy, notwithstanding she had in the abdomen an extra-uterine fœtus, which she carried many years.

Signs of Pregnancy.—I have been, on several different occasions, both vexed and amused upon observing how prone are some medical practitioners to overlook the signs of pregnancy even in married women, their patients.

One gentleman, of great experience, tapped a woman for ascites, but his trocar went into the gravid womb, and penetrated the shoulder of the fœtus. She fell into labor, and recovered of the accident; the child had the mark of the trocar on his shoulder. She afterwards suffered from strangulated hernia of a knuckle of intestine, that escaped through the trocar-opening in the linea alba. This hernia being reduced by Dr. Pancoast, she recovered happily. At a subsequent period, the protrusion again occurring, the gut was fatally strangulated. Professor Pancoast, who made the post-mortem examination, preserved the specimen in the Jefferson College Museum. Many instances of the strangest oversight have occurred within my range of observation, instances in which the size of the belly, the married state of the patient, and the obvious evidences of gestation, as well as its probability, ought not to have been overlooked, nor mistaken for diseases requiring troublesome, disgusting, or dangerous therapeutical prescription. The safest rule would be to suppose every married woman as pregnant, if of the proper age, with suspension of the catamenia, and not giving suck, and to treat her as gravid until convinced of the contrary.

CASE.—Mrs. ———, aged thirty-six, multipara, resident in Philadelphia, was ill on the 15th March, 1850, with diarrhœa, attended with very distressing tenesmus. That able physician, Dr. ———, attended to her during three days, and then left her in apparent good health. She was supposed to be, at the time, one hundred and twelve days gone with child. She had no doubts as to the pregnancy. Ten days after the attack of diarrhœa, March 25th, she began to grow rapidly larger, and the belly soon became so enormous, and so painful from tension, as to induce her to send again for the doctor, who found her, as he supposed, affected with a vast ascites, consisting of many quarts of fluid contained within the peritoneal sac. I know not on what day Dr. ——— first saw her again. The secretion of urine was nearly abolished. The reins and lower part of the abdomen were very painful, yet there was no pain produced by pressure or by palpation. No signs of pregnancy save that the cylindrical cervix was short as in a woman of seven months, and that the cone of the cervix, felt in the vaginal cul-de-sac, was expanded. The os uteri was well closed.

Neither palpation nor auscultation disclosed the reliable evidences of a pregnancy. Still, the woman insisted that she was pregnant and quick with child.

She became affected with nausea and frequent vomiting. She grew thin, and got a haggard expression of the face. She was costive. There was not the least œdema of the limbs or face. Under these circumstances, Dr. ——— announced his desire to tap the patient, which he looked on as the only hopeful means of arresting the vomiting, which now caused her to throw up the whole of the ingesta. The pain from abdominal tension was almost insupportable, and the emaciation extreme.

On Monday, April 22d, I was called in consultation. She vomited everything—was in *great* distress from distension of the belly. Pulse frequent and energetic. Tongue clean. She was tolerant of pressure in every part of the abdomen. The vaginal touch revealed to us nothing to be depended upon, though made with great care. Protracted and anxious auscultation of all the parts of the abdomen, disclosed no fœtal sounds, and long palpation no fœtal turbulency. The patient insisted upon the gravidity, which I could neither affirm nor deny.

Upon consultation, it was agreed to defer for the present the idea of a tapping. She took citrate of magnesia, which purged her well and brought an end to the vomiting. She then took acetic tincture of squills, combined with sweet nitre, for I fully believed in the existence of ascites having at least sixteen quarts for the collection, and I gave this as my opinion, concurring with Dr. ———, physician in chief. I did not deny nor affirm the pregnancy.

On Thursday, May 2d, at noon, Dr. ——— was called to her in labor, which soon terminated in the birth of twins, of five and a half months, the first born being faintly alive for a few minutes, and the second quite dead.

While Dr. ——— sat at the bed foot, a vast quantity of water (a great many quarts) gushed from the ruptured membranes;—a very large bucket-full, was the doctor's expression. Soon after which, the-twins were expelled, and then the placentas, united in one disk, were removed.

To-day, May 3, 1850, I saw her at noon. The womb is firmly contracted in the lower part of the belly, though very large; being about five inches in transverse by seven in longitudinal diameter. I do not think there is any, the least degree of effusion in the peritoneal sac, and the patient is in every respect comfortable.

I do not suppose that I have ever been concerned with a more instructive case than this. Dr. ———, an able and most experienced physician, who has had about 6000 labors, mistook the developed belly for an ascitic tumor, an opinion in which I wholly concurred after the most careful observation, the employment of all the proper means of diagnosis, and serious reflection on the history of the case.

I never have met with a more fluctuating dropsy than this one, the waves being most distinctly and clearly perceptible, in whatever direction propagated by the percussions. *It was dropsy of the ovum.*

My objection to the paracentesis depended upon two points; first, the risk of peritonitis from the wound; and second that of interfering with the uterus, provided she was really pregnant.

But for this hesitation she would have been tapped, and that with my consent, which I was on the point of yielding!!

Let the perusal of this most interesting case serve as a memento for the Student in all instances of such sudden dropsies, complicated with averred gestation. Let the distress of this patient be referred to the same category of influences that occasion so much constitutional irritation from the too rapid growth of the womb, under hydatid gravidity, as in my case, related at p. 244 of this volume. I was greatly shocked, this morning, to find how grave a mistake in diagnosis I had made, and equally relieved to find the patient delivered of her twins and her ascites by the same gush. I beg the Student not to forget this lesson, and I hope he will refer to it before he taps a female of whom it is *possible* to suppose that she is gravid.

Let the Student also imagine, for a moment, how very disagreeable must be the reflections that follow the clearing up of so egregious an error as that of administering powerful emmenagogues to married women, who, nevertheless, would not miscarry; or who, now and then, are found to miscarry under such a diagnosis. The signs by which a woman knows herself to be pregnant are, the cessation of her regular menses and the subsequent enlargement of the abdomen; the movements of the fœtus; certain constitutional or local disturbances or disorders, and modifications of the mammæ. A married woman, who has been well regulated, suspects that she has conceived, if she fails to menstruate at the proper term; but this cannot be considered as conclusive evidence of conception, since so many and such various causes are found to obstruct and divert the regular course of the menstrual function. A second failure, especially if it be not accompanied with any signs of depraved health, renders the suspicion still more valid; while after a third and fourth omission, the change of form, and at last the perceptible motion of the embryo put all doubt to flight. I may say, however, with great confidence, that the audible or palpable movements of the fœtus afford the only true and infallible signs of the existence of pregnancy. But, the audible are far more to be relied on than the palpable signs, at least after the sixth month.

There are many accidental or correlative signs which establish a probability of the existence of pregnancy: among these I may mention nausea and vomiting; a gradual increase or development of the mammæ; a change of the areolæ of the breast, which become more protuberant or elevated, and acquire a dark brown hue, much to be relied upon, especially in first pregnancies. The nausea is mostly found to occur in the morning, and is attended in some individuals with a distressing heartburn and salivation or spitting of saliva. Some people are affected with gravel, or dysury, from the extension of irritation to the neck of the bladder, or from pressure of the enlarging womb upon the posterior surface of that organ. An irritable state of the temper indicates it in some women, which is attributable to the general malaise that must attend the gastric embarrassments which the early stages of pregnancy are so commonly found to produce. Toothache, earache, styes on the eyelids, morph on the skin, a dark aureole around the eyes, and strange, unaccountable longings or appetites are also signs of pregnancy, rather to be noted after pregnancy is fully ascertained, than to be depended upon as sure evidences of its existence.

By means of the Touch, pregnancy may be doubtfully ascertained, before quickening has taken place, but not surely. By the Touch we can readily learn that the womb is enlarged, altered in form, and contains something; but I do not see how any physician can absolutely aver what that something is, unless he can perceive a spontaneous motion in it; so that even the *ballottement*, or tilting the embryo upon the point of the finger, does not furnish, to my mind, any sure evidence that the tilted body is an embryo. I adhere, therefore, to the opinion I have already expressed, that we have no certain signs of pregnancy except those derived from the visible, palpable, or audible motions of the child.

Auscultation, either by means of the stethoscope or the direct application of the ear to the abdomen of the woman, enables us to perceive two very distinct sounds, one of which is the beating of the heart, and the other that which has been called the *placental souffle*, *bruit de souffle*, or bellows-like sound; the latter being occasionally attended with a sound like the cooing of a dove. Whenever we can distinctly hear the beating of the fœtal heart, so as even to count the number of its pulsations, all doubt must be at an end. The placental sound, or the *souffle*, is a very distinct sound, which has been supposed to indicate not only the presence of a fœtus, but also that it lives; the rushing or blowing sound being said to always cease as soon as the fœtus expires: it was said to be, in some way not yet sufficiently understood, connected with the movement of the blood in the placenta, and to cease, of course, with the cessation of that movement, which is itself dependent on the systole of the fœtal heart.

Upon a more scrupulous inquiry as to the value of the *bruit de souffle*, in the diagnosis of pregnancy, it has at last been found that the earlier opinions of it were erroneous, and I believe that there are few well-informed physicians to be now met with who give it even the smallest portion of their confidence in the doubtful discriminations that they are sometimes compelled to make. It is not to be doubted that the sound is produced by the rush of blood in vessels, and in my opinion, sustained by very long practice in obstetric auscultation, it depends upon the motion of blood in the iliacs and hypogastrics. I have certainly heard the same sound after delivery as before the child was born; and I have heard it, as dependent upon pressure by tumors within the abdomen. Hence I have not the least confidence in it as a means in obstetric diagnostication. The sounds of the fœtal heart need never be mistaken. They can be detected at the fourth month, when the opportunity is good. M. Depaul has heard them much earlier. To look for them earlier than the fourth month is, however, in general, merely to lose one's time and find a disappointment.

It is perhaps, on some accounts, of less consequence to be able to ascertain the existence of pregnancy in the married than in the unmarried woman. The lapse of twenty weeks, and sometimes of sixteen weeks, makes it surely known; and the married woman, who has no motive to keep it a profound and important secret, readily imparts a knowledge of her situation, or her suspicions relative thereto, to the physician, or her friends. Not so with the unmarried female, whose reputation depends upon the concealment of her misfortune or crime. I have frequently been sorely embarrassed by uncertainty as to the condition of a patient whose ruddy cheeks and *embonpoint* seemed quite incompatible with a suppression of the catamenia, and whose complaints of aches and pains might possibly be merely assumed as a means of deceiving the medical adviser. Physicians are frequently applied to by the unfortunate or guilty for relief from "*obstructions*," when the applicant has only a design to obtain some powerful deobstruent or emmenagogue, which may serve to procure an abortion, that she knows no honest or respectable medical practitioner could be induced to procure for any pecuniary reward whatever. I hold it, therefore, to be a duty, in all cases, or ranks, to compare the complaints of amenorrhœa with the appearance of the patient, and if some evident malady does not accompany the supposed suppression, to withhold all medical aid, until time or necessity discloses the indications that are to be fulfilled. In physic, nothing should be taken for granted. It is too much to expect that a female, who has it at heart to conceal her pregnancy, will confess it to a medical man. Experience teaches us the very contrary.

CASE.—I was requested some time since by a lady to visit a favorite servant, whose situation excited her apprehension, as she had failed to menstruate for the antecedent seven months, and was already considerably swollen with something like dropsy. Being directed to the young person's apartment, I found her in bed, covered up to the throat with bedclothes, but the face that peeped out from above them actually shone with ruddy health, or agitation, or both. The pulse was natural, the tongue clean, the respiration normal, and the entire physiognomical expression as healthful as possible. She informed me that she had a stoppage of the courses for the last seven months, and felt very bad, and was now alarmed at a swelling of the stomach, which had increased greatly of late. Suspecting that she had an important secret, I asked some questions about pains in the stomach, and, upon permission obtained, placed my hand on the abdomen, being almost certain that I should feel the motions of a fœtus; but, however long I held my hand on the abdomen, no movement of the child could be felt; so that, although I was certain she was pregnant, I was as yet unprepared to tell her so. I at length got permission to apply the ear against the side of the abdomen, and distinctly heard the placental souffle, and afterwards the stroke of the fœtal heart. Upon this assurance, I told her she was pregnant. "If I am," she replied, "I wish God may strike me dead!" and continued, with much temper and even passion, to declare that I maligned her and slandered her. I was obliged to leave her without the least assent, on her part, to my diagnosis, although she knew perfectly well that I spoke only a truth with which she had been long acquainted. She went out of town, and was confined in the country with a fine boy. Many examples of similar perverseness, in denying pregnancy, the signs of which were perfectly plain to me, and ought to have been obvious to the most careless observer, have fallen under my notice; so that I deem it a solemn duty, previously to the exhibition of any medicines, to ascertain that some signs of disordered health are present, in order that I may not commit the unpardonable fault of provoking an abortion, instead of removing a morbid obstruction of the catamenia.

Let me, however, warn the young beginner here, to take special care, in his diagnosis, that he shall first know the woman to be pregnant before he dare venture to say so. How could a gentleman commit a more unpardonable, or more insulting error?

I might here abstain from any further enumeration of the signs of pregnancy; for I am accustomed myself to decline giving an opinion in any case, until I am sure that I cannot be mistaken, which I never can be when I hear the fœtal heart, clearly and distinctly repeating its beats in the womb.

Quickening is not a sign to be depended on by the medical attendant, though it may convince the patient herself; for the woman may perceive it, when the physician cannot. Her convincement ought not to be equivalent to his own convincement. Even the sensible motions felt upon palpation of the abdomen may deceive both the woman and the doctor. Multitudes of such deceptive cases of "*danse de la matrice*" are met with in a long career of practice. I have seen a woman who had the sensible motions of a child in her belly, though she had given birth to a fœtus at full term only six weeks before, and of whom several physicians who examined her had declared the motions to be caused by a child, yet her cervix uteri was an inch long in the vagina, and the abdomen so soft as to allow one to push his hand down so far as to feel the spinal column. She was not and could not be pregnant.

Many of my patients have engaged their monthly nurses and called me in, who were found, when I arrived, to be troubled with tympanitis only. *Tenues in auras evadit.*—See certain cases in my *Letters to the Class*, under the article Tympanitis.

The toothache, the ephelis, the hordeolum, the nausea, salivation, pica, pouting of the navel, and even milk in the breast, are merely inferential signs, and are by no means to be depended on. I repeat, that I can rely only on the heart's motion heard in auscultation, and that sign cannot be detected until the fourth month. This is the rule; the exceptions, few in number, are those in which it has been found in the pregnant woman as early as three months and ten days, as in the instance now to be related from Depaul, *Traité Théorique et Pratique* *d'Auscultation Médicale*, p. 248, where he gives us the following account:—

CASE.—"Madame T——, who has already borne several children, had her courses on the 10th to 15th April. From the 17th to the 20th of same month, she cohabited with her husband; he then left Paris on a journey of a fortnight. Upon his return early in May, he found his lady confined to bed with the early symptoms of a typhoid fever, which in a few days became perfectly well marked, and continued twenty-four or twenty-five days. Her convalescence required a lapse of time nearly as long; and no sexual relation occurred until after her recovery. Nevertheless, upon the first of August following, as her courses had not reappeared, I was requested to see her with a view to determine whether this retention, which was very naturally attributed to the severe disease she had lately suffered, might require the employment of certain remedies for its cure. I confess that I was at first inclined to give up the idea of a pregnancy, begun previously to the commencement of the typhoid fever. I was little inclined to suppose its existence computing it from the new sexual relations succeeding her convalescence; but the examination per vaginam enabling me to detect a notable development of the volume of the uterus, I fell back upon the first opinion, of the propriety of which I became fully convinced, when, after having applied the stethoscope at various times upon the inferior region of the abdomen, I discovered the double pulsations, which were repeated 140 times a minute, while the pulse of the mother was only seventy-six. I could not hear the *souffle uterin*. Her confinement occurred in the following January."

M. Depaul, if the above case is to be relied on, heard the double sounds 100 days, or three months and ten days after the fecundation had taken place. The pregnancy continued 174 days after the audition of these fœtal sounds.

Probably few such early detections will be made by all the readers of this paragraph.

Inasmuch as I have spoken at length on the signs of pregnancy in my *Letters*, I shall beg to refer the Student, for further information, to that volume *sub voce*.

PART III.

THE THERAPEUTICS AND SURGERY OF MIDWIFERY.

CHAPTER IX.

LABOR.

In coming now to this third division of his subject, or Midwifery proper, the Student ought to understand that the practice of this art is one requiring not only a large amount of obstetrical or scientific information, but also a great deal of prudence and delicacy, as well as some knowledge of the world; without which he will scarcely attain to any considerable eminence or happiness in the practice of it. Even the foregoing imperfect statement of the Anatomy and Physiology of Midwifery, subjects which, to be well described, would require several volumes rather than a few short chapters in this one, might serve sufficiently to show him, that a great variety of considerations must precede the study of Midwifery proper; and that those considerations relate not only to the structure and functions of the living body, but also to every step in the development of that body, from the earliest dawn of its existence, up to the complete maturity of its powers and faculties.

There have not been wanting very good writers to show that the whole of this study and practice ought to be confined to persons of the tender sex; asserting that the differences between the sexes ought not to warrant those impudicities that are supposed inseparable from the practice of the Art of Midwifery by men; and, in the world, at the present day, though it is admitted that the Surgeon-accoucheur is an indispensable person in society, he is by many looked upon with a sort of doubt and distrust, on account of the very peculiar nature of his pursuits.

On this question, however, I think any man's mind may arrive at a satisfactory conclusion, if it be only considered that a person with a pure heart and righteous purposes may be safely confided in, as far as relates to the morals of the profession of an obstetrician; and I will add that the objectors to the practice of Obstetrics by males, are perhaps of more impure minds than the accoucheur himself; who, if he be actuated by the laudable motives that ought to rule the life and conversation of every medical man, may retort upon his opponent *honi soit qui mal y pense*, or shame on him who evil thinks. In Midwifery there is much to disgust and nothing to demoralize. The man who practices the art, sacrifices himself.

It ought to be evident to the intelligent and ingenuous Student, that some fit preparation of the mind to the discipline of this Art is required as an introduction to the exercise of it; since, to go at once from the College into the very delicate positions in which he is about to be placed, shows, to say the least, a great want of prudence and forethought. Many clever men have made shipwreck of their hopes by the want of a little reflection as to the course they should pursue; or by early abandoning themselves to professional habits, which, without the least intention on their part, have gradually assumed a tone of familiarity, that has been construed into impertinence, or downright insult.

No woman can be placed in a sanitary condition compelling her to appeal to the aid of the accoucheur, without some sense of a mortified delicacy, and it is quite clear that.the only reparation for, or the only means of obviating this unpleasing impression, consists in the exhibition to her-wards, of the most profound respect and sympathy, and that, too, proffered with a sincere conviction of the painful nature of her position, as well as the indispensable propriety and necessity of her submission to it. A female possessed of ordinary sensibility will be less affected by the sacrifice of feeling she is thus compelled to make, if she be treated as an object of respectful consideration, than if approached with a light and indifferent address; and while she finds her own pride less wounded, will be both more confiding in the wisdom of her physician, and more grateful for his counsel or service, as well as respectful to and considerate of his calling and profession.

The occurrences that befall in the course of an accoucheur's professional life are many times of a nature to require at his hands secrecy and good faith; for he cannot but become the depository of many informations in which are involved the reputation and even honor of persons, and the safety of important private interests.

Let the Student, then, before he goes any farther, take a firm resolution to guard with good faith those secrets with which he may become acquainted as physician or Surgeon-accoucheur. He ought beforehand to consider the meaning of the term professional secrets, and know that they are either accidental revelations, or homage due to his station as physician, and not to himself as person; for of the vast number of those which may be hereafter communicated to him, or discovered by him, not a tithe or hundredth part of them would ever be his but for his professional position. If a man, therefore, is dishonored who reveals a secret communicated by a friend, how far more base is he who takes advantage of his professional standing to make public circumstances that have been intrusted, so to speak, not to himself alone, but to the sacred character of the Iatrist! He disgraces his calling in disgracing himself.

It is not in regard to grave and serious matters only that he is called upon to be silent, prudently abstaining from acquiring for himself and his brethren the unenviable character of the babbler; even the most inconsiderable circumstances as to the sick are confidences that ought not to be disappointed and betrayed. This is a just and true remark, and it is a rule that ought to be followed in all circumstances and ages.

The Caliph Al-Mamun, as we are informed by Abul-Pharajïus in his History of the Dynasties, was a friend of science, and exhibited his patronage of learning by fostering many learned men, among whom were some of our own profession. Among others of his numerous medical favorites was John Ocularius, the oculist, whose duty it was to visit the Commander of the Faithful every day, and that in his most private apartment, alone. The Caliph gave him great honor, and for his services allowed him a monthly stipend of a thousand gold sequins.

Upon one occasion, as the physician came out of his master's apartment, while passing through an anteroom, he was asked by one of the servants: "What is the Caliph doing?" "He is sleeping," was the incautious reply. Unhappily for the Doctor, this reply was overheard by the successor of Mohammed, whereupon the culprit was sent for, and brought before the chief of Islam. "What!" said he to the offender, "have I employed you as my physician and admitted you to my intimacy in order that you should report to my servants as to my private occupations? Go out of my house!"

The poor medico, in telling this story, to account for his fall, added the Caliph never afterwards would admit him into his presence, which was but the just punishment of a professional indiscretion. Let the Student reflect upon the punishment deserved by those who babble the concerns of families or individuals. John Ocularius was turned out of the court of Al-Mamun for merely saying that his master was asleep! suppose the young doctor should say: "My mistress has a sore leg!"

But, in addition to the quality of discreetness above insisted upon, the Midwifery Student should firmly resolve to merit the appellation of Scholar, a title far more honorable than that of knight, nobleman, or minister of state, for it is to the Scholar that the world is indebted for its preservation from its own violence and vices. It is to the Scholar that it is indebted for laws, for science, and for all the arts. The Scholar is the promoter of virtue, and decency, and good conduct, both by his precept and his example; for it is to him that mankind turn their eyes to see what is wisdom, what is virtue, and what is true liberty. All those who are not, by education, brought out of the bondage of ignorance are slaves indeed—slaves of lust, superstition, and ignorance. Hence, it is evident that the Scholar is the only real nobleman, and his nobility becomes more and more exalted in the ratio of his elevation in virtue and knowledge towards the fountain and source of all knowledge and all virtue. Let him aim, therefore, to become a Scholar indeed, not only that he may embellish his understanding with every ornament of learning, but that he may become able also to minister to those who may be committed to his care, *tost, seurement, et sans douleur*, as old Fournier says in his *Accoucheur Méthodique.*

The Student ought not to rest satisfied with the bare intention to make himself equal in skill and dexterity to the common midwives of the country. He ought to be resolved to become fully acquainted with the dynamics of the generation-sphere, by the irregular operation of which, as Wigand says, the power of the uterus in labors is so often baffled, and its energies *misdirected.* If he studies well the therapeutics of midwifery, and practices them well, there will be no occasion to twit him with the reproach so commonly cast on the accoucheur, that when he is called in, "one or the other, mother or child, goes to the grave," to use the words of Wigand, which I cannot but quote in this place. "Gibt es keine gegend, keine stadt mehr, wo das Publikum es nicht anders weiss und gewohnt ist als dass, wo ein accoucheur sein hand anlegt, wenigstens eins von beiden, das Kind oder die Mütter darauf gehen müsse? Kennen, wir jetzt keine Geburtshelfer mehr, die, wo sie hinzugerufen werden, keine andere Indication zu machen im Stande sind, als augenblicklich mit Zange oder Faust, über den unschuldigen Uterus herzufallen, und ihn, wie einem Dieb und Spitzbuben der das Kind gestohlen hat, zu mishandeln?" "Are there not any districts or cities to be found, in which the public generally suppose that where a physician is called in, one of the two, mother or child, must be sacrificed? and are there no accoucheurs at the present day, who, being called to a case of labor, can discover no other indication of treatment than that of instantly, with fists or tongs, falling upon the innocent womb to abuse and maltreat it as a thief or robber that has stolen the child?"

These words of Wigand are strong words; let them sink deep into the heart of the Student, for they are from the lips of as true and noble a Scholar as has in any age graced the annals of Medicine. Let the Student also enter upon his pursuit with a good resolution to add something to the value of the art he is about to practise during his future life; let him leave to the brethren and to the world some fruit or fruits of his observation, his reflections, or his experience. He is about to enter upon a course of life singularly arduous and toilsome, and involving sudden and most painful responsibilities to individuals, and to society at large. He is doomed to sacrifice himself for his station. There are no vacations or holidays for him; and night itself is turned into day, for his occupations cease not with the setting sun; his task is never done. More labors occur at night than during the day, a circumstance that adds greatly to the onerous and distressing duties of the Accoucheur.

Labor is the process by which the contents of the gravid womb are expelled; and the word is highly expressive of the fatiguing, violent, and painful struggles and efforts of the woman to overcome the obstacles to her deliverance from the uterine burden.

Labor should commence, as we have already seen, at or about the two hundred and eightieth day from the last show of the menses, or the one hundred and fortieth day after quickening; and it may, in general, be expected to terminate without any artificial power or assistance, after a few hours of travail—the time being greater or less, according to the amount of the power employed, or the resistance to be overcome. The average duration of labor has been stated at four hours; I should think it greater. There are many examples of women in labor who are completely delivered in ten minutes from the first perception of the signs of parturition; very numerous cases occur in which labor is protracted during twenty-four hours; while some of the patients are occupied three, four, and even five days, with continuous efforts to bring the child into the world. I have witnessed one labor of nine days' duration, and many of from three to five days.

The essential element of labor is the contraction of the muscular fibres of the womb, the end or object of which is the evacuation of the uterine cavity, so that, the whole of its contents being ejected, it may return again to the non-gravid state, when it will measure from two and a half to three inches in length, about an inch and a half in width, and half an inch or three-quarters of an inch in thickness; the organ being, before the commencement of the contractions, about twelve inches long by seven or eight inches in transverse diameter.

As the os uteri is closed during pregnancy, it follows that the expulsion of the contents of the organ cannot take place until the orifice becomes sufficiently opened to permit the child to pass out; and that there is also required a sufficient dilatation of the vagina, and of the vulva; in all which parts a greater or less degree of resistance or obstacle is found; which, taken in connection with the resistance afforded by the bony structures and the perineum, are generally the causes of a delay of several hours in the birth of the child, even where it presents itself most favorably to the openings through which it is destined to effect its exit.

In a vast majority of cases, the powers of the womb alone are insufficient to effect the delivery of the child, and its birth must be aided by the forces of the abdominal muscles, and the diaphragm, which are not only capable of making a direct expulsive effort, but, by presenting a *point d'appui* for the contracting womb, can assist it more efficiently to exert its own peculiar powers. The abdominal muscles and the diaphragm, acting alone, can push the point of the womb down low into the excavation, and hold or fix it there, while the fundus and body of the organ are propelling the ovum against the obstacles that stand in the way of its escape. Hence, although the essential element of labor consists in the uterine contractions, there are collateral dynamic elements of the process that greatly avail in its completion, and that ought always to be well understood, in order that they may be either called into action, or restrained, as the obstetrician may please to direct. Perhaps the best idea of the dilating pains of labor is, that the presenting part of the child is pressed against the circle of the os uteri, which, by the contraction of the body and fundus, is drawn upwards over it, so as to strip the womb up over its head, its body and its legs, until the whole is expelled from the cavity of the uterus.

Cause of Labor.—The cause of labor, or, I should rather say, the cause of the onset of labor, is not well understood, although it is quite probable that it is to be found only in the inability of the neck of the womb, in any given case, to bear further distension. In the beginning of pregnancy, the ovum inhabits and distends only the corpus and fundus of the womb. As the child increases in size, it requires a larger nidus than these parts can afford, so that the upper end of the cervix now becomes distended. Gradually, the whole of the neck is taken in to form the oviform nidus for the full-grown ovum. The os uteri still remains unexpanded; when the ovum has become too large to exist within the completely developed uterus, even the circle of the os uteri can no longer resist the distending pressure. It begins to yield; it opens a little, and, at length, its antagonism to the expulsive powers growing feebler and feebler, it is fully dilated. The whole cervix is now become a wide cylinder, through which the child is thrust by the contractions, which tend to approximate the fundus to the os uteri. This is labor. Labor begins from a necessity of the uterine constitution, and not from any ascertained degree of development of the child, which, whether large or small, is most likely to be born two hundred and eighty days after the last catamenial period of the mother; but may not be born until three hundred, or even more days have elapsed. The size of the child is not found to bear a proportion to the excess of the duration of the pregnancy. It does, in fact, frequently occur, that the womb begins its contractile effort long before the expiration of the two hundred and eighty days; or, on the other hand, it fails to commence its retraction for several days after the two hundred and eighty have elapsed; but, whenever it does begin, it is because it will admit of no further or longer-continued distension; or because the cervix and os will no longer prevent the ovum from escaping, which it always tends to do when they cannot prevent it.

This is the theory by which Baudelocque endeavors to account for it, and which I have above explained. It seems clear that there is a contest or antagonization betwixt the fibres of the cervix and those of the fundus and body of the womb going on throughout every stage of the pregnancy; that, in the early months of pregnancy, the fibres of the body and fundus yield to, while those of the cervix resist the distending force, until about the seventh month, at which time they also begin to yield, and continue to yield until the end of the ninth month. These fibres of the cervix are the seats of a retentive, while those of the fundus and body are the seats of a contentive and expulsive faculty or power. At the ninth month they are balanced, or antagonize each other exactly. At length, the development of the ovum going on, those of the fundus become the more powerful, and those of the cervix and os uteri are loosened, and finally so completely opened as to allow the ovum to escape. The same force which converted the cylindrical into the conoidal cervix continues to operate until it has converted the conoidal neck into the wide cylinder whose diameter is at least 3.8 inches. When this change is once effected, the foetus comes forth into the vagina and then into life. This explanation is, perhaps, as good as any that could be offered; it is perhaps not unworthy of remark, that, in the development of the gravid uterus and its contents, we behold a wonderful adaptation of parts to the purposes they are destined to fulfil; since the growth of the child would, if continued indefinitely, make its delivery impossible, and therefore the Author of nature has, by a simple law, provided against such a fatal contingency; the womb, by that law, refusing to yield any further than is sufficient to allow the child to acquire a certain degree of magnitude and vigor, essential for its respiratory life, but not too considerable to prevent its birth from taking place; and this perhaps is, after all, a sufficient solution of the problem.

Subsidence of the Womb.—The term of utero-gestation and the commencement of labor may be supposed, as has before been said, to be fixed, and rendered necessary in part, by the great distension of the abdominal muscles and the intolerable pressure upon and displacement of the parts contained within the abdomen. I know not what influence upon the production or first excitement of labor contractions may be exercised by the altered state of the abdominal muscles themselves; but it is, perhaps, not too much to infer that they do at length exert some considerable share of influence, by their constant or tonic contractile operation, in aiding the fundus and body to overcome the retentive effort of the os uteri, any yielding or relaxation of which tends to invite or provoke the contractile effort of the fundus. We see, at least, that in the last days of pregnancy the womb settles down with its apex in the excavation, and the woman seems much smaller than she was before this sinking downwards of the uterine globe was perceived. Now, it may be asked what can cause this settling or sinking downwards of the womb, if it be not the action of the abdominal muscles and diaphragm, which have pushed it downwards. Labor pains are caused by the contractions of the womb, and are first situated in the neck of the organ; but it happens that when the womb is much sunken, it in one case feels very hard and firm, as if its fibres were in a state of contraction or condensation; whereas in another case it is soft and flaccid, notwithstanding it may be very much depressed into the excavation; no sign of actual labor being present in either example. The sinking downwards of the womb takes place, in some persons, several days before the first pains are felt. In such instances, the womb must be regarded as wholly passive in the matter; it is forced down by the muscles, and not by any intrinsic action or any power of its own.

This is called the subsidence of the womb before labor comes on, and it is a sign of the approach of that crisis, which monthly nurses and experienced women are acquainted with—and which it is proper that the Student should also be able to appreciate.

Discharges from the Genitalia.—As labor approaches, the secretions of the vagina and os uteri become augmented. They grow more viscid, and are often of a pink or even red color. In some cases there is a clear *show* of blood. The labia externa seem to be swollen or succulent with the increased circulation in their capillaries, and the mucous lining of the vulva retains its moistness notwithstanding the augmented vascular activity. They do not become harder, but, on the contrary, softer and more ductile: which prepares them well to yield to the distending force by which they are soon to open a way for the transit of the child.

Labor Pains.—The contractions of the womb take place at intervals which are longer at the beginning, and shorter as the labor advances. They last from fifteen to thirty or forty seconds, and, on many occasions, even longer. The intervals, at first, are from twelve to thirty minutes; but as the irritation becomes more intense, the pains are repeated every five, three, and two minutes, and even every minute; increasing in violence and duration until the organ is freed from its load.

As to the duration and number of the pains, I said a little while ago that the average duration of a labor has been stated to be four hours. If this computation is a correct one, then it may be said that in the first hour the woman shall have a pain every twelve minutes, which would give five pains for the first hour. If she should, in the second hour, have a pain every six minutes, she would have ten pains in the second hour; pains in every five minutes of the third hour would amount to twelve pains; and if she should be affected with them every three minutes during the fourth and last hour, she would suffer the pains twenty times in that period. So that twenty, twelve, ten, and five pains would make up the sum of forty-seven pains for the labor. The whole duration of the whole of the labor pains, supposing each one to last only forty seconds, would, under this computation, be about fifteen minutes; so that, in a labor of four hours, the woman would be thirty minutes under labor-throes, and three hours and a half without them. It is to be understood, however, that much pain and distress may be sometimes experienced notwithstanding the womb is not actually contracting, or during the intervals; though, generally speaking, the woman is comfortable except when under the power of the *pains.*

This calculation refers, therefore, only to the state a woman is in when under the influence of a labor pain, and not to the other causes of distress, from pressure, distension, and the distension of the textures in the pelvis.

There is a very singular passage in Saccombe's *Elémens de la Science des Accouchemens*, p. 202. I was much tempted to translate the whole story as he relates it, not only as a case excellently calculated to give instruction to the young, but quite as much so to show forth the impudence and audacity of that singular and talented author. The case in question is the history of a labor which he had charge of, and which he observed, from beginning to end, without in the least interfering with the operations of nature. He was alone in the chamber with the young woman. "En cet état des choses, je me suis mis en embuscade, l'œil au guet, et bien resolu d'abandonner entièrement la patiente à la nature, comme si elle eut été seule au sein d'un bois. La, le compas dans l'œil, la montre d'une main et le crayon de l'autre, voici le spectacle vraiment ravissant dont je fus temoins." M. Saccombe goes on to say that, from ten o'clock exactly, to eleven A. M., the woman in labor had seven pains, which became greater and greater in succession, and followed each other in the order here expressed.

	Interval of	Duration of pain.
From the 1st to the 2d pain	15 minutes	21 seconds.
" 2d " 3d	14 "	27 "
" 3d " 4th	10 "	27 "
" 4th " 5th	8 "	29 "
" 5th " 6th	7 "	32 "
" 6th " 7th	6 "	35 "

From eleven to twelve o'clock she had twelve pains, increasing progressively and recurring as follows:—

From the 7th to the 8th pain	6 minutes	36 seconds.
" 8th " 9th	6 "	40 "
" 9th " 10th	6 "	42 "
" 10th " 11th	5 "	45 "
" 11th " 12th	5 "	45 "
" 12th " 13th	5 "	47 "
" 13th " 14th	5 "	49 "

From the 14th to the 15th pain	5 minutes	55 seconds.
" 15th " 16th	4 "	62 "
" 16th " 17th	4 "	70 "
" 17th " 18th	4 "	87 "
" 18th " 19th	4 "	93 "

As the clock struck twelve, the waters of the amnios gushed forth, and, as he says, "*me baignèrent de la tête aux pieds.*" At the 20th pain, the head passed the inferior strait. With the 21st pain the head was born. After a rest of five minutes, the 22d pain carried the right shoulder to the sacrum and the left to the pubis, and the 23d pain expelled the child; five minutes after which the placenta was thrust forth from the organs.

The pain felt in labor is owing to the sensibility of the resisting, and not to that of the expelling organs. Thus the sharp, agonizing, and dispiriting pains of the commencement of the process, which are called grinders, or grinding pains, are surely caused by the stretching of the parts that compose the cervix and os uteri and upper end of the vagina. Pains are rarely felt in the fundus and body of the organ; and nineteen out of twenty women, if asked where the pain is, will reply that it is at the lower part of the abdomen, and in the back—indicating, with their hands, a situation corresponding to the brim of the pelvis, and not higher than that—a point opposite to the plane of the os uteri.

When the pains of dilatation are completed, and the fœtal presentation begins to press open the lower part of the vagina, the pain will, of course, be felt there, and is finally referred to the lower end of the rectum, the sacral region and perineum. The last pains, which push out the perineum and put the labia on the stretch, will of course be felt in those parts chiefly. The sensation, under these circumstances, is represented as absolutely indescribable, and certainly as comparable to no other pain.

The effect of the pains on the bladder and rectum might easily be foreseen; but, even where they fail to excite the sympathetic action of those parts, the descent of the fœtal head, which sometimes fills up the pelvic canal as a cylinder is filled by its piston, must cause the evacuation of the entire contents of the lower rectum and bladder of urine.

The effects produced by the pains and efforts of labor upon the constitution are very striking. The woman is in the beginning anxious, irritable, and full of the most gloomy anticipations; but as the process goes on, and the expulsive efforts become more and more violent, she acquires courage and firmness and the most dogged resolution: the patient seems like one who has a task set which she is resolved to execute as rapidly as possible; and she therefore bears the great pains of expulsion far more submissively, or courageously, than the small or dilating pains.

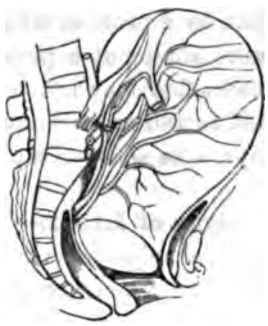
The actions of the woman indicate pretty clearly to the practised eye, the state of advancement of the process. Previously to the exit of the head from the os uteri, or its deep insertion into that circle, the voluntary efforts of the patient are confined to a violent grasping of things with her hands. She generally seizes the hand of a bystander, and squeezes it violently or endeavors to twist or wring it, not *pull* it. Such an action always indicates a grinder, or a pain of dilatation; but when an expulsive effort takes place, she not only grasps with all her force, but she pulls at anything in her reach; so that an experienced accoucheur generally can decide, upon entering the chamber during a pain, that the dilation is or is not completed, by observing whether the patient merely squeezes or presses the hands of her assistants, or, on the contrary, whether she pulls them with great violence.

The low position or situation of the presentation at length brings on a tenesmus or bearing-down sensation, which is a desire to thrust with all the forces of the abdominal muscles, whatever exists within the pelvis, beyond the limits of the body. Tenesmus is, in the beginning, controllable by the will, but when it has become exaggerated by the presence of the presenting part in the ostium vaginæ, no exhortation or fear is capable of inducing the woman to refrain from making the tenesmic effort, in certain cases; sometimes, however, the patient may be aroused from the all-absorbing tenesmic sense, and made to heed the urgent appeals of the surgeon to desist from efforts that endanger her. The urine and stool are generally expelled pretty soon after the commencement of the tenesmic pains of labor; but in some patients, the first signs of labor coincide with a disposition to go to the close stool.

In addition to the signs derived from the woman's voluntary actions, the practitioner can frequently decide upon the degree of forwardness of the labor, by attending to the nature of his patient's expressions and moans, and to her respiration. In the early stages, during the dilating pains, she either gives out her breath freely, with voice, or merely holds it, making use of no straining or bearing-down effort; and even if she be here requested to strain or bear down, as at stool, she will resist, or cannot obey the injunction.

Women cannot bear down, at the very beginning of labor. Bearing-down means an effort to expel, by contracting the muscles of the belly; but when the womb is full, its fundus at the scrobicle, and the os at the plane of the strait, the recti muscles cannot expel, they can only hold or compress it: the same is true of the oblique and transversalis muscles. When, however, the fundus has descended low in the abdomen, having followed the os uteri, which has, by this time, been pressed down to the bottom of the excavation, then the abdominal muscles can exert a vast expulsive energy. So that, when the os uteri is nearly or quite opened, and the real expulsive pains begin, the woman not only holds her breath, but makes use of the muscles of respiration, to fix the thorax firmly, and then, in the most forcible manner, contracts the muscles of the abdomen upon the womb. If she be now enjoined to desist from bearing down, and fails to obey the injunction, it is because the tenesmus of labor, like that of dysentery, is irrepressible. The muscles that she employs in bearing down, after she has fixed the diaphragm and other muscles belonging to respiration, are the rectus abdominis, the external and internal obliqui, and the transversalis. Is it not clear that, while the fundus uteri is high up in the abdomen, the violent contraction of these muscles would have little effect in forcing the uterus downwards, but would rather compress the womb against the back part of the abdomen; while on the other hand, when the uterine globe has sunk low down in the belly, the operation of these abdominal muscles, as agents of expulsion, must become very great and cogent? I have ever found it useless to urge a woman to bear down upon a grinding pain, and always feel it incumbent upon me to cause the nurses and bystanders to desist from exhorting the patient to bear down in the early stages of labor; an exhortation which they very kindly, but very untimely, never fail to make. Such voluntary efforts cannot be beneficial in their influence on the labor, and may even become pernicious, in certain circumstances, where they not only tend to disorder the sanguine circulation, but very much to exhaust the strength.

Fig. 76.



I have placed here a cut, Fig. 76, which shows the state to which the cervix uteri must come before the full efficacy of the true expulsive, or bearing-down pains can become manifest. This is a cross section of the pelvis, with the womb and a part of the already dilated vagina. It seems that the cervix uteri has become almost cylindrical, from being a cone, as it was before labor began. The bag of waters is seen bulging out from the fully dilated orifice. The waters are nearly ready to give way—and, in fact, there are many labors in which, as soon as the crevasse in the membranes takes place, the child's head rushes rapidly through the orifice, and descends to the very bottom of the excavation, or is even expelled by the same single pain.

Constitutional Effects of the Pains.—Even leaving out of the question the exciting effects of the pangs and agonies of travail, we should naturally expect that the muscular exertions of the parturient subject would, as in any violent exercise, greatly accelerate the circulation of the blood, and augment its momentum; and we accordingly find the pulse to become more and more elevated as the efforts prove to be greater and greater. The heart beats with increased violence, and the pulsations amount to one hundred and upwards in the minute; even one hundred and twenty beats are not uncommon. The respiration becomes hurried in proportion, and of course the heat of the body tends to be developed *pari passû* with the augmentation of the circulation and respiration; so that fever would soon become intense, were it not that the most profuse diaphoresis, chiefly from the upper part of the body and head, comes on to prevent the occurrence of what would, otherwise, become a dangerous fever, and in a few instances does become so. I have already taken occasion to remark upon this excited state of the vascular system, that it is not to be deprecated except in those instances in which it goes beyond the just bounds. It is, however, always worthy of close observation, in order that any tendency to excess may be checked, by a free use of cooling drinks; by ventilation; by lightening the bedclothes; by making the patient comfortable in her bed—appeasing her anxiety of mind by assurances of care and protection, by removing wet sheets and heated pillows; by an enema or purge; and, lastly and chiefly, by the use of the lancet.

The state of the mind is worthy of a large share of the accoucheur's regard. The most cheering and satisfactory assurances that the state and prospects of the labor will admit of, should be given, with a due observance of the truth. A woman will be more comforted and composed by being made certain that she shall be delivered in six hours, than by a promise which she does not fully believe, that half an hour more shall put a period to her anguish. No promises should be made, that may not be implicitly relied upon by the physician himself, as well as by the patient. One of the golden verses of Pythagoras says, σεβου οςκον—Keep thy troth.

Signs of Labor.—The signs of labor are those which we obtain from simply observing the woman's manner, and from hearing her own account of her symptoms; or they are such as we obtain from the *Touch*, or examination *per vaginam.* For the most part, the statement of the patient herself, or that of her monthly nurse, is taken as our sufficient early evidence, and we wait for a certain degree of manifest progress before we address ourselves in a more particular manner to establish the absolute diagnosis, which cannot be very certainly done without the Touch.

Still, there may be observed the subsidence of the abdominal swelling, owing to the sinking of the apex of the uterus into the excavation, and, in some measure, to an increase of tonicity in the whole organ.

In most of the cases, the new vital activity set on foot, manifests itself by augmented moisture of the genitalia, and especially by a viscous mucus, that not a little resembles the white of eggs, which, moreover, is frequently stained with a little blood coming from the disrupted capillaries about the cervix uteri. This tenacious mucus is not yielded by the vagina, but always and only by the cervix.

An increased tendency of the bladder of urine to expel its contents also marks the beginning of labors; and the rectum is generally affected by the pelvic excitement, which prompts it to discharge of its contents.

Nausea and vomiting are frequently met with in the lying-in room, as symptoms of commencing labor; though it is true they mostly present themselves when the os uteri is about one-third dilated.

Violent and protracted tremors of the body and limbs, with clattering of the teeth, as in ague, are very generally observed, but they are unaccompanied with any chill or sense of coldness.

Finally, pain in the back and hypogastrium, lasting about twenty seconds, attended with hardening of the uterine globe, and recurring at regular equal intervals, is a sign much to be relied upon, though the vaginal taxis gives us the safest assurance by revealing the state of the os uteri.

In general, we are accustomed to note, by a watch, the length of the intervals betwixt the pains, and to form an opinion of their intensity, by the gestures or moans, or other complaint of the woman.

If the patient have reached her full term, we are free to announce, from these diagnostic signs, that labor is begun; and if, upon making examination *per vaginam*, we find the os uteri dilated ever so little, and the membranes rendered tense during the pains, we may be quite sure that the parturient process has commenced. The application also of the hand to the abdomen, discovers during each pain a certain hardness and rigidity of the uterine globe that give place to a flaccid and pliable softness during the absence of the pain. Such are signs of the true pains of labor.

Touching or Examination.—If the patient's assent can be obtained, after the proper reasons for asking the privilege of making an examination *per vaginam* have been laid before her, we should have two principal objects in view, while performing that operation; one of these is, to note the presentation, and the other, the position. There are other observations to be made at the same opportunity, such as the situation of the internal parts as to place, and the softness or relaxation of them—their moisture or dryness—the state of the rectum, and the sensibility of the organs concerned in the parturient process, as natural or morbid.

Upon obtaining the patient's consent to the examination, she should be requested to lie on the bed upon her left side, with the hips near the side or foot of the bed—being about eighteen inches from the edge or end—and with the knees drawn upwards towards the abdomen, a small pillow being placed betwixt them. Except upon occasions of the greatest emergency, a third person should always be present; and the physician ought to refuse to perform the operation of Touching, except in the presence of a third person, who should be some elderly individual, acting as nurse for the occasion.

Let the attendant provide a napkin, and a small quantity of pomatum, lard, or other unctuous substance, and a basin of water for the hands, which must always be bathed before performing the office of Touching. When a smart pain comes on, the left hand of the practitioner being pressed against the sacrum of the patient, outside of the bedclothes, the forefinger of the right hand, properly anointed, should be introduced into the vagina, nearest to, and pressing slowly upon its posterior commissure, taking care not to bruise or irritate the patient by any rough or hasty proceeding. The finger should be bent so as to let the knuckle pass in to the orifice first, after which the point may be extended. This advice was inculcated by Saccombe.

Old Paul Portal, at p. 3 of his *Pratique*, &c., says, you must proceed to this operation "commençant aux parties supérieures de ces levres, et descendant le long du clitoris; l'on prendra soigneusement garde de blesser l'urethre qui se trouve située au dessous," &c. &c. This old author could not have given a worse advice in this matter, and I recommend to the Student to follow my directions, and not his.

If the point of the finger be now carried along the posterior wall towards the upper extremity of the vagina, the os uteri may be felt, and its degree of dilatation ascertained. When the finger comes to the os uteri, if the pain still continues, let the greatest care be taken not to rupture the chorion or bag of waters, as it is called, especially in a first labor. These membranes become extremely tense during the pain, which forces them down through the opening of the womb, forming a segment of a sphere of greater or less size, according to the greater or less degree of the dilatation; if they should be too rudely touched while in a state of tension, they might burst, and permit the liquor amnii to escape, an event unfavorable in the early stage of labor, which it both retards and renders more painful. There is no need for pressing against the bag of waters during the pain, because by waiting until the pain subsides, the bag becomes relaxed, and can then be pushed back again within the mouth of the womb, so as to enable the finger to touch the presentation. For the most part, we only ascertain, in such an examination, the presentation, and being satisfied with that, we wait until a great dilatation, or the discharge of the waters, allows us to discover the position.

This examination is commonly called *taking* a pain, and we seize the moment of pain mainly for the purpose of avoiding to embarrass the patient, whose mind, fully occupied in perceiving the painful sensation, is at the moment somewhat diverted from the awkwardness of the situation. Hence, let the Student understand that he is to pass the index finger while the woman is in pain, but to make the exploration after the pain is gone.

During the operation of *Touching*, we also endeavor to learn the condition of the orifice of the womb, as to whether it is rigid and unyielding, or soft and dilatable; whether it be thick and dry, or thin and moist, with an abundance of glairy phlegm. We also ascertain whether the os uteri is in a favorable position, that is, in the middle of the pelvis where it ought to be, or on one side; or high up behind, towards the sacrum; and we rectify its position, if need be, by changing the situation of the mother to her back, or to either side, according as we may judge most fitting to bring the mouth of the womb into its proper place. Thus, suppose the mouth of the womb inclined altogether to the right side of the pelvis, the patient being on her left side; let her turn on to her back, or quite over to her right side, and the axis of the womb will be brought more nearly to the middle line, or axis of the pelvic canal. We are, also, in this operation, to form an opinion as to the probable resistance to be made by the vagina, perineum, and labia, so as to make up our prognosis, which it is best, however, to keep as a secret not to be divulged for the present.

At length, the pains having opened the os uteri to the greatest extent (as in Fig. 76), and driven down the bag or bladder of waters almost to the orifice, the membranes burst and the fluid of the ovum escapes with a gush, which is called the breaking of the waters. As soon as practicable after the escape of the liquor amnii, the Touching should be repeated, and now there is little difficulty in determining the position of the presentation, though it may often be ascertained beforehand, through the unruptured membranes.

In general, that side of the pelvis in which the head can be felt at the lowest level is the one to which the vertex points; for the vertex must dip, in order to enter the bony canal. But if, upon feeling the scalp with a finger firmly pressed upon it, a suture is discovered, which, upon being traced, is found to meet with two other sutures, and only two, that point of meeting will be the posterior fontanel or vertex; and it will be in the first position if it be near the left acetabulum; in the second position if it be found near the right acetabulum; and in the third position if it be directly behind the symphysis of the pubis. But if, instead of three sutures, there be four, with a large membranous or soft space betwixt their points of union, it will be the anterior fontanel; and if it be near the left acetabulum, the head will be in the fourth position; in the fifth if it be to the right acetabulum; and in the sixth if it be near the pubis. Let not the Student forget that when the head presents in a flexed attitude, it is a vertex presentation, no matter to what segment of the excavation the vertex may be addressed—nor that, in the first three vertex positions, the posterior or triangular fontanel is to be felt, while the quadrangular or anterior fontanel only is met with in the three last—*videlicet*, the fourth, fifth, and sixth positions.

False Pains.—These are pains that afflict some women towards the end of pregnancy, and which, however severe and regular they may seem, are nevertheless very justly denominated *false pains*, to be distinguished from the true ones only by Touching.

I have many times been kept out of my house all night, near a patient supposed to be in labor; and having been refused the privilege of making the examination until morning, after so tardy an admission of my request, I have found the os uteri perfectly closed, with a still tubulated or cylindrical cervix; so that I have been obliged to announce not only that the patient was not in labor, but that she had not yet reached the full term of pregnancy by ten days or a fortnight.

It is exceedingly vexatious thus to be baffled by the unreasonable backwardness of the patient to submit to an operation which she knows to be necessary and inevitable; but we shall, in all the early stages of labor, except those where the water comes off at the very commencement, be liable to such disappointment and deception, until we verify our other inferences by the infallible test of Touching.

The similarity of these false pains to the true pains of labor is very great; there is even to be felt the hardening of the abdomen; but, if carefully appreciated, it will be found that the rigidity is occasioned by a contraction, not of the womb itself, but of the muscles of the belly, that are so constricted upon the uterine tumor as to make even the womb appear to be contracted; whereas it is actually only compressed by the abdominal muscles. False pains, then, are essentially involuntary contractions of the abdominal muscles. They are, probably, of the nature of tenesmus, and are caused either by the ventral irritation produced by the distended womb, or else by intestinal irritation from sordes, flatus, acidity, rheumatism, and other causes that would also suffice, in the non-gravid state, to bring on spasms of the abdominal muscles. The difference between those of the non-gravid and those of the gravid state is, that in the former they are paroxysmal, but in the latter they are regularly periodical; which latter character they acquire from some law of the uterine innervation that I am unable to explain.

False pains are, likewise, common symptoms of rheumatism of the womb. This rheumatic disorder is far more common than has generally been supposed; and, when misunderstood, is the fruitful source of anxiety and doubt to the practitioner, besides of insufferable distress which it occasions for the patient herself.

Wigand, *Géburt des Menschen*, band i. p. 82, says that although rheumatismus uteri is sometimes connected with rheumatic pains of other parts of the body, yet, for the most part, only the womb and organs of generation suffer on such occasions. The causes, he thinks, are to be found in the hyperæsthetic state of the gravid womb, its exposure to cold from its projecting position, and carelessness as to dress during pregnancy.

The characteristic signs of the disorder in labors consist, according to Wigand, in a general painful sensibility of the womb to the touch, which is attended with contractions of the organ that are painful alike at the beginning, middle, and end of the labor-pain. The pain of a contraction in the rheumatic womb differs thus from that of a healthy uterus. In the latter, a normal pain gives no distress during the first half of the contraction (Wehen Cyklus), for the *pain* of a labor-pain does not commence until the mass of the organ begins to exert its superior power by thrusting the presentation into the dilating cervix uteri and vagina.

I have met with several instances of rheumatic gravid womb, where the woman was tormented with false pains for many days previous to the real attack of labor. In one delicate female, pregnant with her first child, there was daily pain in the womb for a month before the child was born; and these pains had so far the external characteristics of labor, that the most experienced practitioner might be deceived by them, until he should clear up the diagnosis by the Touch. The Touch alone could convince him that the os uteri was not in the least concerned in the matter; the tubule or cylinder of the vaginal cervix remaining as completely undeployed as in the most perfect repose of the gestation. In all such instances, the globe of the womb is sore to the touch, and only the slight occasional condensations that occur in all wombs towards the close of pregnancy could be looked to as the sources of the patient's distress. It may well be conceived that a rheumatic uterus could not but be painful whenever its parts should be disturbed by the normal contractions of its muscular tissue. This remark, however just and important to the Student, is not new; for Portal, who practised in the middle of the seventeenth century, expressly declares that he met with women in whom the womb became dilated to the size of a piece of fifteen sols, and then closed again; the pregnancy continuing to the full term; when they were delivered without at any time experiencing any serious inconvenience from the circumstance, p. 4. In certain examples of rheumatism of the uterus, I have found the patient with a sore belly, often supposing herself in incipient labor, and as often disappointed; yet disclosing to the Touch a partially dilated os uteri for many days, yea, even for a whole month, before the veritable attack of labor came on.

Let the Student remember that, when he shall be hereafter summoned again and again to a *false alarm*, as it is called, for the same patient, he will probably have to treat a rheumatismus uteri. Let him bleed such patient; let him keep her in bed, covered rather too warmly than not enough so with bedclothes; let him give her some doses of Dover's powder, or anodyne enemata, at night; let her abdomen be bathed two or three times a day with equal parts of warm oil and laudanum, and let him see to it, that she entertain a soluble state of the bowels by means of gentle aperients, among which pure precipitated sulphur, with calcined magnesia, is perhaps one most to be desired.

CASE.—I advise the Student early to come to the resolution of being cautious in his diagnosis and prognosis of these doubtful cases of labor, for I know there belongs to professional men a disposition to *pronounce* at once, which, perhaps, arises from a false pride, prompting them to seem to know all things at a glance, or by mere intuition. If the young beginner, being called to a supposed case of labor, should witness a very regular recurrence of pains in the belly, and should also place his hand on the abdomen of the woman during one of these pains, he might find it very hard, and be led to *pronounce*, "Yes; it is her labor." Let him never pronounce, let him never give an *opinion*, until he knows upon what it is founded. For example: I was called, in the month of July, 1841, to a lady having very regular pains, which she said were like those she had experienced in her two former labors. During one of these, I held my hand on the abdomen, which became hard, and evidently so because the womb was contracting strongly. "How far are you advanced, madam, in your pregnancy?" "Seven months and one week, sir!" "In that case I ought, before making any prescription, to learn absolutely whether the womb is opening or not; for if it be opening, then your labor is begun, and must proceed; if not, then you ought to have some remedy to prevent it from beginning, lest your child should be born prematurely, and thereby lost, from its non-viability." Effectively, I found the os uteri open so much that I could introduce two fingers and touch the chorion, which was tense. The cervix yet retained a quarter of an inch of its tubular form. I said, "You are in premature labor; but, as there is not the least degree of vascular excitement, and no pain except this that you complain of, I shall send you a portion of laudanum, in hopes of arresting the case here." She went out to her full time, up to which date I was repeatedly called to give assistance in her supposed attacks of labor. But, when the labor came on in earnest, the relaxation of the cervix was already so great that she delivered herself in a very few minutes. I am surprised, when I reflect upon it, that the retentive power of the cervix and os uteri should have enabled her so long to keep the ovum within the womb. This was doubtless a specimen of disordered innervation of the womb, arising from a rheumatic principle acting on the mass of that organ. She had just come ashore from an East India ship, from Madras. Such cases as the above occur repeatedly in course of a considerable practice. I have seen a patient with the os uteri as large as a dollar, and with strong pains, cease to suffer, sit up, walk about, and even go out for days in succession, before the labor was resumed and terminated.

The regular manner in which labor pains recur has long been the subject of curious speculation. I have not found any writer whose explanation of this periodicity satisfies me, and shall not repeat here for my reader the mere hypotheses which I reject myself. It is enough to state that the contractions increase in frequency and power in proportion as the uterus grows small, or approaches more nearly to the moment of excluding its gravid contents—a most singular phenomenon, which, of itself, is almost sufficient to refute all the existing hypotheses as to the anatomical arrangement and composition of the muscular texture of the organ. The observation, however, is perfectly true. In the contraction of the muscles of locomotion or relaxation, we find that the greatest power of the organ is excited at a point midway between elongation and the greatest condensation. Thus, the biceps acts with the greatest force when the arm is bent to a right angle, and not when it has drawn the hand up to touch the clavicle, nor when the arm is fully extended; but in the case of the uterine fibres, if we adopt the common theories, we must admit that the nearer the extremities of the muscular fibres are brought to each other, the stronger do they act. In the case of the uterine fibres, whatever be the cause of the first contractions, or whatever be that of the periodical return of them, both the forces, periodical and dynamic, seem to acquire strength by exertion. The weakest pains are those which are met with in women who have the womb enormously distended with water, or with twins; the uterus, in such cases, seeming to be distended beyond the just limit, and to lose thereby its tonic or contractile force; a case similar to that which is observed in an over-distended bladder, which, as is well known, refuses to act upon its contents; so that, even with the catheter introduced, it is sometimes necessary for the physician to aid the bladder by pressing his hand strongly upon the hypogastrium.

The indisposition to energetic movement in a womb too greatly distended by an excessive quantity of liquor amnii, or by twin pregnancy, may for the most part be obviated by early rupturing the ovum, and allowing the waters to run off; but we cannot, even by this practice, always remove a certain atony or apathy of the womb, which embarrasses the labor very much; nor always prevent a troublesome hemorrhage after delivery, the consequence of that atony. The womb, like the bladder, when once overstrained by distension, is exceedingly prone to relax and fill, so as to become over-distended again, because it is inert—atonic.

The whole muscular apparatus of the womb does not enter into contraction at the same moment of time. The fundus may be the first to begin the contractile movement, or the muscular mass of the cervix may take the initiative in the action, which, extending slowly to the whole muscular tissue, engages it at length in one uniform and equable effort at condensation of the whole womb. The observation of this fact is due to the celebrated Wigand, already quoted, one of the most careful and intelligent investigators of the phenomena of parturition who has existed in any age or country. Since my attention was called to it, in his beautiful work, *Die Geburt des Menschen*, I have many times noticed that the earliest evidences of movement, upon the ecommencement of the pain in labor, was a gentle drawing together, onstriction or contraction of the mouth of the womb. This motion have discovered by the Touch, before the woman herself was made onscious of it; and I have said: "Now the pain is come," to which he replied in the negative, but soon corrected herself; for, as I have aid, when the contraction begins in the cervix, it overspreads or exends to the whole organ, and then causes pain.

The fundus, in other instances, is the first to exhibit manifestations of contractility. In this case, if the indicator finger be held in contact with the circle of the os uteri, so as, at the same time, to touch the bag of waters or head of the fœtus, it will be found that the bag grows more tense, and begins to descend; or the head moves downwards, being urged on by the contraction of the fundus, before the circle of the os is felt at all to constringe or harden itself.

In a labor pain, the whole womb contracts. Let not the Student, then, imbibe the false notion that the cervix relaxes while the fundus and body contract. It is true that he will find, in a labor pain, that the contraction of the fundus commonly lasts longer than that of the cervix, and that the cervix becomes more dilated towards the latter half than in the first half of a pain, agreeably to Wigand's observation, *ante:* if the pain continues twenty seconds, and the woman is exhorted to bear down her pain, she ought not to begin to bear down during the first ten seconds, but should exert herself to improve the last ten seconds. The advantage of doing so has appeared to me very great, in numerous labors that I have superintended.

In the matter of labor pains, it is worthy of remark that the tenor of them is uncertain, and the action often capricious. For example, the cervix may give way regularly and progressively to a certain point where its dilatable disposition ceases for a time, giving place to the most obstinate rigidity: it is wrong then to prognosticate of a matter so uncertain. A man founding his prognosis upon the equable progress of the dilatation in a labor may announce that the end is nigh—when the dilatability is only nigh to a certain point where it is destined to stop for many hours.

Near the close, when, by the contractions of the fundus and corpus uteri, the child's head has been forced partially into the vagina, the tenesmus, or straining with the auxiliary or abdominal muscles, begins, and, as I have already mentioned, the whole womb, with its contents, is now pushed downwards. Under these circumstances, the circle of the os uteri descends very low in the excavation, and its anterior lip may be felt, stretched behind and across the pubic arch, a little below its crown. There is no labor in which the anterior segment of the circle of the os uteri does not descend lower than the crown of the pubal arch in front; but as soon as the mouth of the womb is fully opened, and the head completely lodged in the vagina, the lips of the womb ascend quite to the top of the pelvis in front, and as high as the projection of the sacrum behind—the os uteri encircling the throat of the fœtus with a gentle or strong constriction. At this stage of the labor, the fundus uteri approaches much nearer the os uteri—nearer by at least four inches, or four and a half, perhaps.

When the head escapes from the vulva, the thorax of the child takes its place in the vagina, and at last, as the thorax emerges, the abdomen and the lower extremities succeed it in that place, so that soon, nothing remains in the womb but the placenta and membranes, with a few ounces of blood and water. The fundus is now not more than five inches from the os uteri, instead of twelve inches, as it was at the beginning of labor. The womb is strongly contracted in the last expulsive throe; and if the placenta were not detached even earlier than this, it could scarcely retain its connection with the uterine surface, now that the superficies is so greatly reduced in size. In fact, we do find in a large majority of cases, the placenta pushed wholly or in part into the vagina by the same pain that forced the abdomen and breech of the child to take that situation; or, if it be not thrust quite out of the womb, it lies loose and detached within the cavity, and ready to be expelled upon the slightest renewal of contraction, or even by the voluntary expulsive effort of the abdominal muscles. Instances do occur, of a morbid adhesion of the placenta to the womb, in which it is not detached even for some time after the birth of the child; and I think I have noticed that, where the attachment exists at the anterior part of the cavity, it is least apt to be thrown off by the same pains that expel the child. The constringing movement at the fundus is greater than at the front or back of the womb; hence, a placenta attached to the fundus is more likely to come off well than one seated on another part of the cavity.

The separation of the placenta is commonly followed by an effusion of blood. This effusion is inconsiderable in proportion as the action that condenses the uterine tissue is more energetic and stable. It is supposed that nearly all, if not all, the blood that comes off flows from what was the placental surface of the womb. Now, as the placenta is from fifteen to twenty inches in circumference, it will occupy a space equal to such a superficies, on the womb, before labor begins; but when the womb has contracted so as to be no bigger than two fists, the utero-placental surface must at last be not more than one and a half or two inches in diameter, so that the effusion from its vessels is greatly checked, and, in very tonic uteri, wholly suppressed for a time. If in any case the tonicity ceases to exist, then the womb expands again more or less, and blood begins to flow. The womb owes its condensation to the muscular contractions, for the muscular fibres are disseminated everywhere in the substance of the organ; but inasmuch as there is a great deal of arterial, capillary, venous, absorbent, and cellular matter that serves to make up the sum of the uterine mass, these materials, which are not contractile, serve as elastic resistance, antagonistic to the muscularity, and thus cause the organ to spring open again as soon as the muscles relax, or lose their tonicity. It is desirable, therefore, after delivery, to have a well-contracted and tonic womb.

The Child.—During the whole of this process of parturition, the child is quite passive; if alive, its body possesses a certain degree of firmness and solidity (wanting in the dead fœtus) that enables the womb to force it downwards, and cause it to dilate the parts it is destined to pass through. It does not assist itself; as, indeed, it could not do, with thighs and arms flexed upon the body and legs crossed perhaps upon the epigastrium, and pinioned by the coats of the womb, which press it together into a compact and passive olive-shaped mass.

If the child be dead, and especially if it have been long dead, its tissues are less firm and resisting; its articulations are all loosened, and even the cranial sutures become relaxed, so that when the contractions of the womb act upon the fœtus to expel it, the whole mass of it yields to a certain extent, and is squeezed together by the pains. Under such circumstances, the parts to be dilated are opened much more slowly; for a portion of the power is expended or lost in pressing the soft and yielding mass of the child into some degree of solidity before it can be efficaciously impelled against the organs to be riven open. In a first labor, a child long dead is often a cause of trouble. It might almost be true to say that, in this sense, a living child helps itself in the labor, while a dead one does not.

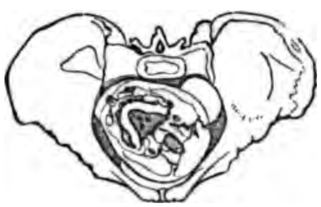
Outward Thrust of the Spinal Arch of the Child.—At the beginning of labor, the womb acts only upon the ovum *en masse*, compressing the membranes and their contents. The lower part of the chorion is pressed like a bag into the os tincæ, and protrudes through it, and is often burst and the waters discharged, before the fundus of the womb comes at all to press on the child's breech and push it downwards. But whenever the fundus uteri does begin to compel the child downwards, it can only do so by acting on the pelvic extremity of the spinal column. The cephalic or cervical extremity of this column of course resists the force, and the spine becomes more arched. It is as if one end of a bow were set upon the floor, and the hand resting on the upper end should press it directly downwards in order to bend the bow. The outward thrust of the arch is in this case so great that the ends of the bow strive to retreat to the parallel of the centre of the piece. In the same manner, the cervical end of the spinal arch, attached as it is to the condyles of the occipital bone, will naturally thrust backwards, and thus raise the vertex and depress the chin; or I should rather say (as the head is downwards), it will depress the vertex and raise the chin, forcing it towards the infant's breast, while the vertex, which is the occipital extremity of the occipito-mental diameter, descends, as the presenting part. This happens the more readily, as the child's head lies over the pelvic opening, which, so to speak, yawns to receive it.

This bending of the neck, or carrying of the chin to the breast, is a most important act in the mechanism of a labor; it is called the flexion of the head; and when it takes place in due degree, it enables the head to descend into the pelvis with very little obstruction; for the other change, called the rotation of the head, does not take place well if this first step fails. The head of a child at term passes very easily into and through a well-formed pelvis, provided it present certain of its diameters only to the canal. Now the diameter extending from the child's chin to its vertex is 5.5 in many children: but the outlet of the pelvis is nowhere more than four and a half inches, at most. Of course, the child could not be born, should it present such a diameter. Again, the diameter extending from the vertex to the space between the eyebrows, is fully 4.5, and often more than that: but from one ischial tuberosity to the other is but four inches, so that, were the occipito-frontal diameter of 4.5, to become parallel with this bis-ischiatic diameter of four inches, the head would stop; it could not descend any farther. The vertical diameter of the head is, however, only 3.75, which is smaller than any one of the pelvic diameters; so that no great obstruction can, in any natural labor, be offered by the bones, provided the chin, early in the process, be borne strongly against the breast, so as to make the vertex descend, and cause a considerable dip of the horizontal diameter of the fœtal cranium.

Positions.—Though I have treated on the subject at p. 85, I shall here recapitulate some remarks on positions, a word which, in Midwifery, refers to a relation existing between a cardinal point on the pelvis and a cardinal point on the child's head. The cardinal point on the pelvis is the acetabulum, or rather the acetabular region. The cardinal point on the child's head is the vertex or posterior fontanel. When these two cardinal points come together, the position is number 1, and the other positions are called 2d, 3d, 4th, 5th, or 6th.

The promontory of the sacrum juts into the superior strait in such a manner as to turn any rounded body off, either to its right or left side, and accordingly, it rarely happens that either the forehead or the vertex can pass down immediately in front of the promontory; but, as there is a sacro-iliac concavity on each side of it, the vertex, or the forehead passes down in this concavity, which gives to the head an oblique direction as to the opening, or plane of the superior strait. The cut, Fig. 77, shows how the intrusion of the promontorium into the outline of the superior strait may serve as a guide to the forehead, compelling it to rest in the right, or in the left sacro-iliac space, as the case may be. The forehead, in a majority of instances, goes to the right of the promontory, or in front of the right sacro-iliac symphysis, while the vertex descends below the brim, opposite to the left acetabulum; not at a fixed point, but either nearer the front of the pelvis, or more posteriorly, as the case may be. Indeed, the child generally is found to bore with its head, so as to turn the vertex now forwards, and now backwards, until at last it becomes fixed in one position, by getting under the arch of the pubis. So common is it to observe the child to descend with the vertex opposite to the left acetabulum, that that is taken or counted as the first position of a vertex presentation; and Baudelocque, whose authority on this subject is much followed in the United States, enumerates a second, third, fourth, fifth, and sixth position, the enumeration or order being founded on the supposed relative frequency of the several sorts, as they are met with in practice.

Fig. 77.



Thus the most frequent, according to Baudelocque, is the first position, in which the vertex is directed to the left acetabulum, and the forehead to the right sacro-iliac symphysis. Here the two cardinal points come together.

Next in order is the second position, in which the vertex is to the right acetabulum, and the forehead to the left sacro-iliac symphysis.

The third position is that in which the vertex is behind the pubis and the forehead in front of the promontory.

The fourth position is that in which we find the vertex at the right sacro-iliac symphysis and the forehead towards the left acetabulum.

The fifth position is that in which the vertex is at the left sacro-iliac symphysis, and the forehead towards the right acetabulum.

And lastly, the sixth position, wherein the vertex is at the promontory and the forehead at the symphysis pubis.

It is doubtless extremely convenient and proper to reduce all the possible modes of vertex presentations to a small, yet sufficiently comprehensive classification; but the reader, and especially the young Student, should remember that all these classifications are human inventions. They are the proposita or the dogmata of different men; and, in fact, it is possible for any presentable part of the head to present itself at any part of the brim. If he should, however, find any difficulty in remembering the order or application of these several positions, let him make use of such an arrangement as the following, which I place before him in this connection, rather than refer him back to an antecedent page.

Beginning with the vertex at the left acetabulum, let him say, vertex left; then, proceeding to the second position, in which the vertex is at the right acetabulum, let him say, vertex right, and so on, for the whole of the six positions, as follows:—

Vertex left, vertex right, vertex front. Forehead left, forehead right, forehead front.

If the vertex be at the left acetabulum, the forehead is, of course, at the right sacro-iliac symphysis; if it be at the right acetabulum, the forehead is at the left sacro-iliac junction, and *vice versâ;* for all these six positions are vertex positions. So, if it be forehead left, the vertex is at the right sacro-iliac joint. If the forehead be to the right, the vertex is near the left sacro-iliac symphysis; if the forehead be front, the vertex is towards the promontory. Hence I repeat, vertex left, vertex right, vertex front; forehead left, forehead right, forehead front. The first three are occipito-anterior positions, and the last three are occipito-posterior positions.

I have ever found this enumeration the easiest one to remember; and, as a real nomenclature of the positions, I prefer it to all others, and recommend it to the Student of Medicine.

Madame Boivin, in her *Mémorial sur l'Art des Accouchemens*, gives us a table showing the relative frequency of these positions.

In her practice, in 20,517 births, there were 19,584 vertex presentations, of which there were of the

1st	position,	15,693
2d	"	3,682
3d	"	6
4th	"	109
5th	"	92
6th	"	2

Madame Lachapelle's practice, in 22,243 births, showed that there were 20,698 vertex presentations, of which there were of the

1st	position,	15,809
2d	"	4,659
4th	"	164
5th	"	66

That distinguished obstetrician, Dr. C. F. Nægèle, Professor of Midwifery at Heidelberg, asserts that, while the most ordinary position of the vertex presentation is that in which it is found nearest the left acetabulum, the one next in frequency is the fourth, or forehead left position, and he calls it, therefore, the second, in his enumeration. Dr. Nægèle makes this enumeration of first and second positions at page 114 of his *Lehrbuch der Geburtshülfe, &c.*, and at sect. 264, p. 120, gives his views as to the very ordinary occurrence of fourth positions; and at sect. 267, p. 122, declares that, *cæteris paribus*, the forehead-left positions are as favorable for the mother, and the child also, as the first or vertex-left positions—the vertex rotating spontaneously from the right sacro-iliac junction to the right acetabulum, and then to the pubal arch.

In a conversation I had with this venerable and most honored professor, at Heidelberg, in 1845, he gave me convincing proofs of the correctness of his opinions of these circumstances.

Indeed, I had kept a register of presentations a few years before, upon learning, through a publication of Dr. N.'s *Mechanism of Labor*, made by Dr. Edward Rigby, now of London, that the common view, as to the greater frequency of the vertex-right position, was erroneous. I am fully convinced, by my register, and by the course of my clinical experience ever since, that Professor N. is quite correct in his statements; and I venture to assure the medical student that, while he shall surely meet with vertex-left positions more frequently than any others, he shall as surely find the forehead-left positions next in point of frequency.

This is a comfortable doctrine; for, the tyro, who has studied in the books the so-called mechanism of the head in the pelvis, is very likely to be startled at the first case of forehead-left presentation he shall meet with; but if he now learns that it is a natural position, and the one second in point of frequency, he will not suffer himself to be disturbed by the occurrence; particularly if he remembers Dr. Nægèle's assurances, as above expressed. Dr. N.'s words are: "Die geburten bei der. zweiten shädellage gehen, unter übrigens ganz gleichen umständen, durchaus ohne grössere Schwierigkeit als die bei der ersten, vor sich, und es hat nicht den allermindesten Einfluss auf die Mütter oder das Kind, ob der Kopf sie in der ersten oder in der zweiten Shädellage zur Geburt stellt."

Dr. Edward Rigby, of London, who was Professor Nægèle's pupil at Heidelberg, translated, some years since, as I stated, a small volume of his worthy teacher's on the mechanism of labor. At p. 36, Dr. N. informs us that, according to his observations during many years, made with the greatest possible care and attention, the fourth position, that in which the occiput is near the right sacro-iliac symphysis, is, after the first, far the most frequent in occurrence of all the head presentations; whereas, he thinks our second position of the vertex occurs very rarely. Out of one hundred labors where the head presented, there were twenty-nine cases of the fourth position; and out of another series of thirty-six labors there were twenty-two of the first, and eleven of the fourth position. The result of his inquiries shows that the fourth is to the first position in frequency, as one is to two and a half.

I am glad to be able to confirm Dr. N.'s statement so far as to say, that I am of opinion, from my own experience and observation, that the fourth position is far more frequently met with, in my own practice, than any other except the first. The reader has already seen in the table, that in Madame Boivin's records the relative frequency was 15,693 of the first, 3,682 of the second, and only 109 of the fourth. I am sure that the statistical record will not be borne out by the experience of any reader of the Midwifery Library. Professor Simpson agrees with Dr. N.'s views.

Mechanism.—Let the head enter the pelvis obliquely, the vertex being in the first, or vertex-left position; it is not to be understood that the dip of the horizontal diameter of the head will carry the posterior fontanel into the centre of the pelvic canal: on the contrary such a dip would be too great; but the vertex, or posterior fontanel, glides down along the ischium, repelled by that bone, and directed by its inclined plane inwards and forwards; so that it describes a spiral line in its descent, and the vertex, which on entering the upper strait was directed to the left, is, without any change of posture of the child's body turned near a quarter or a sixth of a circle, to bring it under the arch of the pubis, beneath which it extends itself again after recovering from its first flexion, so as to allow the crown of the head, the forehead, the face, and last of all the chin, to roll out, in succession, from the floor of the vagina and edge of the perineum. These three mutations are the most important in the mechanism of labor: first, the flexion; second, the rotation; and third, the extension of the head. The regular succession of these several states is necessary to an easy natural labor: and the principal business of the medical attendant, in such labors, is to see to it that they occur in due order and time.

I am reminded here of the necessity there is to warn the Student to pause for a moment, and consider what is really the presenting part in a first or vertex-left position. He should reflect that the fontanel, which is directed towards the left acetabulum, is a good ways off from the ostium vaginæ towards the left—and that, in fact, the part that he Touches in his Examination is the right parietal bone, whose parietal protuberance meets the point of the finger introduced for the exploration or diagnosis. To reach the vertex, therefore, he must carry the palp of the finger upwards and outwards, and backwards towards the left acetabular region, where it will come in contact with the triangular or occipital fontanel. In second positions or vertex-right positions, it is the left parietal boss that presents, and so on as to the rest of the positions. The vertex, therefore, is not, strictly speaking, the *presenting point* in vertex labors until the rotation has become complete.

As to any person's being able to explain the mechanism of the pelvis, or its operation in parturition, without the aid of the subject, either recent or dried, I hold it to be an impossibility. Let the Student, therefore, who wishes to comprehend this matter, which involves probably the most important information that he will have occasion for in obstetric practice—let him take a dried pelvis and a fœtal cranium, each well and naturally proportioned to the other—let him plunge the cranium into the excavation, holding it in the first position, but without flexion; he will find that it cannot descend very far, on account of the rapid approach of the inclined planes of the ischia below. But if he now turns the vertex somewhat downwards, or brings the chin upwards, it will descend a little farther. As he presses it downwards, the inclined plane of the left ischium tends to repel and deflect it towards the pubic arch, in which direction no great bony resistance is offered. If it glance upon the obturator membrane, and indent it, the resiliency of that tissue is sufficient to repel it still more, and still more to deflect it towards the front; in fact, it easily takes a pivot or rotatory movement, which is greatly enhanced or promoted by the structure of the back and lateral parts of the pelvic excavation, which are so inclined as to likewise repel and deflect the forehead backwards, and cause *it* to fall into the hollow of the sacrum. Let this experiment be tried both with the dip or flexion, and without it, and it will be seen that in the first case the rotation is almost spontaneous, and in the last very difficult, if not impossible, without powerful extrinsic aid.

The rotation being completed, the vertex is found jutting forth under the arch of the pubis; it emerges more and more completely until the occiput, or the upper part of the nucha becomes pressed against the crown of the arch, when the further progress of this part ceases—it becomes a fixed point, or it is an axis, on which the head, as before said, turns or rolls out from the orifice of the vagina, at the close of which evolution the extension of the head is complete.

After the head is born, the face turns again to the side of the pelvis, towards which it was directed at the beginning of labor, or before the rotation began; and that is called its act of restitution. If the vertex when within the pelvis was left, it seeks the left when driven outside of the excavation.

While the head is undergoing these mutations, the shoulders of the child are entering the basin. In the first position, the vertex is to the left acetabulum, and the right shoulder to the right acetabulum, while the left one is to the left sacro-iliac junction. As the shoulders descend, the right one rotates towards the arch of the pubis, and the other falls backwards into the hollow of the sacrum; the thorax is now plunged deep into the excavation, where its farther progress is arrested by the floor of the pelvis. A renewal of the uterine effort forces the left shoulder to glide off from the apex of the sacrum and coccyx, and displace the perineum, which it thrusts backwards, out of its way, until the shoulder is born. The edge of the perineum is now retired so far backwards as to allow the right shoulder to disengage itself from above, and then from beneath the crown of the pubic arch; and the body of the child is immediately afterwards expelled with great violence, occasioned by the irresistible tenesmus the woman experiences in this stage, and which compels her to bear down with her whole energy. Sometimes the shoulder nearest the pubis is first expelled; generally the other is the first to be born.

A repose of eight or ten minutes follows the birth of the child, and next, a slight pain, or a voluntary bearing down, expels the placenta and membranes, as before said.

The almost supernatural exertions and struggles of the woman, as well as the painful sensations she experiences, and the novel impressions made upon her nervous system by the successive stages and occurrences of parturition, have brought about a violent excitement of the nervous and circulatory systems of the economy; the former of which is resolved by cries of joy, by tears, and by the delightful sense of security, of triumph, and finished toil, and by that gushing tenderness which a mother feels for her new-born helpless progeny. The excitement rapidly abates, under the more or less abundant effusion of blood, and the abstraction of the stimulus of exertion, pain, and dismay. The flood of perspiration gradually subsides, and a short sleep, the best restorative, soon permits the patient to feel "comfortable," a phrase peculiarly adapted to the case of a puerperal woman. A review of the whole of the phenomena, both physiological and psychological, that are evolved during the progress of a case of labor, presents perhaps the most perfect example of the condition called hysteria that can be anywhere observed. I shall not devote these pages to a comparison of them with those of an hysterical paroxysm, but merely refer the reader to his clinical observation, whether past or future, for a confirmation of this view of the case. Indeed, the whole matter of a labor is *ipso facto*, a matter depending merely on the status or modality of the womb, and its influences and sympathies. It therefore is a pure specimen of the local action and constitutional influences displayed by the child-bearing organs, or what Wigand calls the whole generation-sphere.

The lochia, for such is the denomination of the bloody discharge that follows, flow in such abundance as to require five or ten napkins to imbibe the blood effused during the first twenty-four hours; after which they decrease in quantity, and grow pale, until, by the tenth or fifteenth day, many women have none but a whitish discharge, which also ceases between the twentieth and thirtieth day.

On the day after delivery, the globe of the uterus appears to be larger than it was immediately after the discharge of the placenta. It can generally be felt, in the hypogastrium, during from six to ten days; after which it retreats into the recesses of the pelvis, diminishing daily in size, until, by the end of the month, it is nearly as small as before it was gravid.

Such is the history of Labor, in general terms, which, though it may perhaps afford a pretty good *coup d'œil* of the phenomena by which it is characterized, is not sufficiently in detail for the purposes of this work; on which account I shall proceed to treat of other particulars in the ensuing pages.

In general, as soon as the signs of respiratory life are fully established in the child, the cord is to be severed by the attendant, who divides the navel-string after having secured it with one or with two ligatures, and puts an end, by this severance, to all foetal connection with the mother.

As to the child, it comes, in a good labor, healthy and vigorous into the world. The loud sounds of its vagitus, its cries, pervade the apartment, and carry consolation and even transport to the bosom of the fatigued, exhausted, and terrified parent. "Ah, mi corazon! Mi carrissimo, querido corazon!" said a Spanish lady, from the midst of her pangs, as soon as the head of her offspring became free, and before the shoulders were born—for she heard its vagitus uterinus—and her heart "leaped up" with passionate expressions of love, to greet it even before it was completely ushered into the world. As a physician, who has passed a life among those who were in pain, in peril, and in fear of imminent death, I must have been witness to many scenes of human emotion—but of all the expressions of love, made manifest and identified in voice and in speech, that I have ever witnessed, the most intense, the most rapturous and sacred, have been the thoughts that breathed and words that burned as they vehemently issued from the lips of a young mother, whose body had just escaped from the fell sufferings of those who, in sorrow, travail in child-birth, according to the primal woe pronounced against the sex.

The child being born, it remains that the secundines, consisting of the placenta and membranes, shall be expelled from the uterine cavity. The same kind of power that was used to force the child into the world is required for the delivery of the after-birth.

I believe that the after-birth comes off in about ten minutes. There are many labors in which the placenta is chased out of the womb into the vagina by the same pain that pushes the child forth. But, in general, this is not the case, the placenta being only loosened and detached, in whole or in part, and left lying crushed up into a sort of ball by the contraction of the womb upon it.

After a repose of some ten minutes, it may be, and it is an indifferent matter, twenty minutes, the contractile power of the uterus is again in activity. This excites the tenesmus, as before, and the woman, bearing down, coincidently with the uterine contraction, pushes forth the after-birth, generally accompanied with coagula, and a quantity of fluid blood. The pregnancy is thus brought to its close.

Lochia.—After the expulsion of the entire product of the conception, the patulous orifices of vessels, left exposed by the separation of the placenta, freely discharge several ounces of blood. This discharge is called lochia. As the cavity of the womb [illegible] not obliterated by the conclusion of the labor, it must happen that the blood effused within its capacity shall coagulate, and that the patient shall discharge from time to time a utero-morphous-clot, as large as an egg, or as large, sometimes, as a man's fist. As the organ grows smaller and smaller, these coagula become smaller and smaller—the flow assuming more and more the appearance of the menstrua. In the course of a fortnight in some, of a month in others, the last traces of uterine excretion dependent on the late pregnancy have disappeared, and the woman is restored to the Jewish estate of cleanness.

The lawgiver of that ancient race pronounced that a woman could not be clean until the fortieth day. But our Christian women generally deem a month sufficient for the whole process of the uterine purgation.

As to the lochia, let the Student learn that, when the milk begins to be abundantly secreted, which is on the third day, or about seventy-two hours after the close of the labor, the mammary molimen serves to check the determination to the womb; and consequently to lessen the amount of the lochia—which, however, becomes again abundant on the fifth day. Can it be that the opened orifices of the uterine vessels, from which the lochia are discharged, shall return to their normal, non-gravid condition, without the intervention of a state fit to be called phlebitis? Such is the proposition of an able French writer. If those vessels cannot recover their ordinary state without passing through a stage of inflammation worthy to be called phlebitis, however slight that may be, it is certain that we ought to feel no surprise when we find such inflammation to become violent, dangerous, or even fatal, by developing all the phenomena of pyogenic fever, and consequent pyæmia.

Having now given a plain account of what happens in an ordinary labor, I shall in the next chapter proceed to give directions for the Conduct of a Labor. I cannot, in doing so, avoid some iteration, nor shall I apologize further for so doing, since, without repetitions, I cannot possibly maintain the even tenor of the story, for, though Obstetrics is a Science, it is made up of a vast number of unconnected items.

CHAPTER X.

CONDUCT OF A LABOR.

THE conduct of a labor comprises the whole management of a parturient patient, from the first beginning of her pains until the complete exclusion of the secundines, and it also includes all that is done for the security of the mother and the child during the period immediately ensuing the birth. As labors are extremely various in their characters as to duration, pain, facility or difficulty, the title at the head of this chapter is a comprehensive one, and fruitful of topics which, if properly handled, could not fail to prove interesting and instructive to whatsoever reader might desire, under such a head, to seek for useful, and indeed even indispensable information.

The conduct of a labor might refer to any, and so to all possible events and circumstances of Midwifery; for Midwifery, after all, is but the conduct of labors.

Any person meriting the name of obstetrician may be supposed competent to the conduct of a natural labor where the series of phenomena proceeds with rapidity and in a perfectly natural order of succession and duration, provided he will remember the oft-repeated adage, "a *meddlesome midwifery* is bad," and be willing to abstain from impertinent interferences; for a kindly Providence hath so ordered this painful office of parturition, that the accoucheur, in most cases, hath really little to do except receive and protect the child, and attend to the delivery of the after-birth; extending his care to the disposal of both the mother and her offspring for the first few hours after the termination of the conflict.

The bearing of children, however natural and healthful it may be in the great majority of women, is found to be sometimes so painful, so difficult, so dangerous and even impossible without help from without, that every woman about to be confined, ought to be provided with a skilful adviser or assistant, because in the most natural labor there is at least some risk that the patient might hurt herself or that the child might suffer injury or death from the want of prompt scientific aid. This liability, which has always existed, must ever continue to render our calling indispensable in all civilized states; for, to use the quaint expressions of the oldest English work on Midwifery, I mean the *Woman's Booke; or, the Byrthe of Mankynde, by Thomas Rainalde, Physition.* Fol. XI.: "The Mydwyfe muste enstruct and comfort the partie, not onlye refreshyng her with good meete and drinke, but alsoe with sweete wordes, gevyng her goode hope of a speedeful deliveraunce, encouraging and enstomakyng her to pacience and toleraunce, byddyng her to holde in breathe so much as she may; also streyking genttily with her handes her belly above the navell, for that helpeth to depresse the byrth downewarde."

The above words of Rainalde, however quaint or antiquated, really convey an idea of much that it is incumbent on the obstetrician to say and do in the exercise of his calling, and even he who practised in the reign of King Henry the Eighth, appears to have felt that if a woman in labor, affected with the wildest terror, and magnifying by a distorted view every pain, could be made to clearly understand the nature and causes of the pains, their uses and results, as well as the physician himself does, she would become tranquil, patient, contented, and even cheerful under sufferings, that should otherwise frighten her from all propriety.

To conduct a labor properly, the practitioner ought to make a correct diagnosis, which, when it is once truly made, enables him to form an opinion as to the prognosis. But, however sure he may feel that his prognosis is well founded, he should not commit the great imprudence of indicating the moment at which the labor is to end. It is quite natural and right that he should give "sweete wordes," as Rainalde says; but since it is impossible to foresee all the circumstances that may arise in the course of a labor to interrupt its course, it is best to be cautious in the making of promises, for should the appointed or promised moment arrive without bringing the expected happiness, the woman is capable of reflecting that her physician has either made a great mistake, or that he has purposely deceived her, either of which is a dilemma for him and her also. It is far better, after having acquired her confidence, to deserve it and shew her that it is well placed by telling only the truth as he knows it.

Many times does it happen that startling incidents, vexatious disappointments, and unforeseen causes of delay come to discompose the complacency, and dispel the serenity of the medical attendant. He is scarcely well fitted for his occupation who allows any signs of such influences to appear in his words or gestures, for he is there to "comfort the partie with sweete wordes," to encourage and enstomak her to "pacience and toleraunce."

For most women in labor, the pulses, the respiration, and the temperature of the body, become considerably increased, and this excitement is liable to such great exaggeration as to bring the woman and the child into danger. As a moderate increase in the action of the heart, the lungs, and the nervous system is a natural condition for parturient women, any such normal state ought not to be interfered with, but it is important to keep watch, lest the phenomena should take on an abnormal character; and every careful and skilful physician should be ready to apply the checks and remedies for these disordered actions of nature. Any excess of excitement ought to be counteracted at once to prevent it from passing into fever, into inflammation, or convulsion, or exhaustion, which are not uncommon results.

It is only under extraordinary circumstances, as where the woman happens to be seized with some disease while in labor, where there is something wrong in the presentation or the position of the child, some fault in the form of the pelvis or of the child itself, that the accoucheur is called in to interfere with a process so natural and so healthy as that of childbirth. Indeed, the chief part of the surgeon's duty consists in giving such directions as may be requisite to prevent the woman from injuring herself, and in inspiring that confidence in her own powers, which she is apt to lose when suffering under the intolerable pains, or despairing of the hoped-for relief which seems to her to grow more and more remote as the crisis comes nearer and nearer.

The mind of a parturient woman is often observed to be in a sort of tumult, so that she grows bewildered with doubts and fear, and pain, and she greatly needs the comfortable words which would mean nothing in her case, unless uttered by a person in whose skill and knowledge, derived from long experience, she could confide. Women are sometimes observed to become so much disordered by this doubt, fear, and anguish, as to give no heed to, and take no comfort from the words of the medical attendant, and so, fall into great danger from the reaction of mind on the body, the progress of the labor being suspended, or its course quite perverted. But if some other physician happens to be called in, one on whose knowledge and good judgment she is willing to rely, the whole scene changes, and the process begins to go on with regularity and without further complainings or any disorder whatever.

I have often supposed, in observing the good influence of kind and confident assurances, and intelligible explanations given to parturient women, that a great part of the distress they experience in childbirth ue to the alarm and doubt that attend it, and that to take away late the panic element of labor, would be to deprive the act of parturition of a large share of its anguish. I have in a great many instances observed, that the pains have fallen, or become irregular and spasmodic, in consequence of this constitutional irritation, and that they recovered their vigor and regularity by removing the excess of bedclothes, bathing the hands, face, and throat with cool water, and by the exhibition of cooling drinks, together with free ventilation of the apartment. Great comfort and even renewal of strength, hope, and courage, commonly follow a change in the outward circumstances of the patient, as to her bed and other things relative to her labor. Thus a woman who may have been lying for seven or eight hours upon the same spot, comes, at last, to sink into a sort of pit made by the weight of her hips. The continued escape of fluids, as urine, liquor amnii, blood and serum, which are all heated by the heat of her own body, is frequently found to wet her up as far as the shoulder blades: and she remains pinioned as it were to the spot, and as if lying upon a blister, aching in every limb, and imploring death, which she really expects. Such a person should, as a mere act of humanity, be taken up, cleansed from head to foot, and replaced upon a bed made up with clean bedclothes. In cases where these simple cares would not suffice, I have often re-established the regular course of events by taking blood from the arm.

Notwithstanding most women have a greatly increased frequency and force of the pulse during the more active stages of labor, it is not universally the case; some females passing through the whole process without any change whatever in the rate of the circulation.

CASE.—The following case was under my care on the 9th of February, 1828. Mrs. B., aged twenty-five years; in labor with her first child; was attacked with the pains at seven o'clock A. M., and was delivered at twelve o'clock of a healthy female infant. The whole amount of blood discharged at the separation of the ovum did not exceed three ounces. The pulse was very slow throughout the labor, not exceeding *sixty-five pulsations per minute*, even during the most violent expulsive pains. Some time after the complete expulsion of the secundines, the os uteri was two inches in diameter, and as hard and smooth as a ring of ivory.

CASE.—November 3, 1840, I attended Mrs. W. C. L., aged twenty-two years, in labor with her first child. The pulse during the whole process never rose above seventy-two, and soon after the birth of the child fell down to sixty-five beats per minute. The labor commenced at two o'clock A. M., and terminated at five o'clock P. M. The pains, even the great ones, were but a few minutes apart, so that I have rarely witnessed a more tedious one, notwithstanding many have fallen under my notice which were much more protracted. I could cite from my practice many cases in which the pulse was quite unaffected throughout the whole process of parturition.

Professor Dewees was celebrated for the boldness and good judgment with which he resorted to venesection, in some cases of labor. The quantity drawn by him, in instances he reported, although, doubtless, fully demanded by the exigencies at the time, and justified by the results, may, nevertheless, have induced some persons of lesser powers of discrimination unnecessarily to resort to a similar mode and extent of depletion; hence, it is not uncommon to hear of very large bleedings, of thirty to forty ounces at a time, during labor. I must say, that I think such very large abstractions of blood not often necessary, and therefore, take this opportunity to warn the reader to discriminate carefully concerning the quantity to be drawn in each particular case. For example, where the woman has become too much excited as to her circulation, in the manner above pointed out, I have no idea that it is necessary to draw away a great quantity of blood: let him not bleed until the pulse becomes soft—he does not want a soft pulse. In labor, or at least in the violent stages of labor, the pulse ought to be full, vigorous, and somewhat accelerated. If he bleeds till the pulse becomes soft, he will substitute for a state of excitement and excessive power, one of debility and lowness, quite as much to be deprecated.

The purpose of venesection, in the instances I at present propose, is to take off the strain of the bloodvessels—to mitigate the general excitement which ensues upon too rapid a revolution of the blood. I therefore think that it is better, for the most part, to limit our bleedings, for these general purposes, to something under, rather than over sixteen ounces. But on the other hand, where symptoms, strongly threatening apoplexy, convulsions, pulmonary hemorrhage, inflammation, &c., make their appearance, the lancet should be used in the most fearless manner. The same is true of those cases where a great relaxation of the tone of the tissues is required for some special and pressing object, such as the relaxation of a strictured vagina or very rigid uterus, the removal of a violent congestive or inflammatory accumulation of blood in the brain, &c. &c.

The facility and promptness with which the alvine discharge can be effected by means of enemata, makes a resort to them very common; and, in fact, where only a slight reduction of excitement is wanted they fully answer the end proposed; yet a dose of some neutral salt, magnesia, or castor oil, may be beneficially administered where there is sufficient time for the alvine operation to take place before the delivery of the child. Aperient doses are useful in some labors, because it cannot be doubted that the constitutional disorder brought on by the pain and fatigue of labor, must, in some measure, extend to the digestive organs; nothing, indeed, is more common than to meet with parturient patients who vomit very much; while water-brash, heartburn, and sour eructations are also exceedingly common, and often quite distressing.

As to the exhibition of purgative medicines to women in labor, it ought to be understood that, in the selection of the article, care should be taken to provide one not likely to operate violently; which would be objectionable, as to the trouble it might give during the parturient process, and the inconvenience experienced by alvine operations soon after the birth of the child. For my own part, though I prefer, in general, that such a patient should not have a dejection until the third day, I commonly advise a dose of castor oil where I have to fear a long and reluctant dilatation of the cervix. I administer the drug in such cases, because I seem to have observed that the operation of it tends to suspend the power of the cervix and os uteri, or relax the sphinctorian force of the retentive fibres of the uterus, just as it does that of the sphincter ani muscles. It excites also the expulsive faculty of the womb, as it does that of the colon and rectum, and abdominal muscles.

CASE.—This day, September 2d, 1848, I found an os uteri not bigger than a swan's quill, though the waters had gone off full fourteen hours, and the woman had had sharp pains for eight hours. I gave her a tablespoonful of oil, and in three hours the child's head had passed through the dilated os into the vagina.

The foregoing remarks show not only that medicines of an aperient kind are frequently indicated in obstinate and protracted labors, but they ought to show that care is required as to the exhibition of food to such patients: some food is wanted, particularly for those whose pains are of so lingering a kind as to allow the process to remain unfinished for many hours. For the most part, tea, bread, or gruel, sago, &c., are found to suit the patient best. The fittest drinks are gum-water, toast-water, lemonade, cold water, and such like articles; the object being to sustain the system by means of nutriment and drink while under severe effort, at the same time carefully avoiding to call the force in the direction of the digestive organs by overtasking them. The whole powers of the economy should, therefore, be husbanded and preserved as much as possible in their normal condition, in order that they may be directed and determined towards the womb and its auxiliary organs. In the case of a very slow labor, which should be unattended with constitutional symptoms, or any evidences of gastric disorder, a light broth, or even some small portions of very digestible meat, might, upon due reflection, be allowed to the patient.

Decubitus.—The attitude of the patient exercises, in many cases, a notable influence on the progress of labor. It is the almost universal custom in this country and in England, to direct the woman to lie upon her left side, with the knees drawn up; a posture which is highly convenient to the practitioner, and productive of the least possible exposure. But where the labor proceeds slowly, the heat and the pressure occasioned by lying still in the same position, become injurious. The woman ought, therefore, to be directed to turn on her back, or even on the opposite side, or to rise and sit in an easy chair, from time to time. I do not recommend that she should be too much urged upon this point; and I note, that the influence of custom is so great, that a proposition to turn on the back is not unfrequently received with something like astonishment and aversion by the bystanders, who seem to regard that attitude as, at the least, indelicate. Hence, it is proper to assign reasons for the request.

Where the retardation arises from an improper direction of the expulsive forces, it is of the highest importance to direct the patient as to her attitude. For example, if a lateral segment of the os uteri can be felt towards the middle of the pelvis, and the other one is either out of reach of the finger, or very high up on the side of the ischium, the fundus uteri is directed to one side of the abdomen, giving more or less obliquity to the long axis of the womb, and of course an oblique line of direction to its forces, which are decomposed and so, partially nullified. A change of position to the back, or the opposite side, will bring the plane of the orifice to its proper place in the pelvis.

Case.—On Sunday, November 30th, 1828, I was sent for to visit Mrs. C., whom I found lying upon her right side. The pains seemed so expulsive, that, when I arrived, I expected to receive the child immediately, for she bore down like one in the last throes of labor. I requested her to turn upon the left side, because that position was the most convenient for me. She did so. The pains now became inefficient and partook, in appearance, of the character of the grinding pains. I found that the uterus had obliqued far down to the left side, as soon as she turned over, which interfered with the due exercise of its power. She was again placed on the right side, which brought the womb into its proper line of direction, and the labor ended, after three or four pains. Similar consequences follow from an anterior obliquity of the axis of the uterus; but, in this case, the anterior segment, or lip of the womb, seems to hold the head as in a sling or pouch—the anterior portion of the cervix being stretched across the head, far behind the middle of the pelvis, while the posterior edge of the circle either cannot be felt at all, or is found high up towards the promontory of the sacrum. It is evident that, in such a state of things, a good deal of power must be lost in pushing away the anterior part of the cervix, a power that should be determined in the proper direction. To do this we may draw the os uteri forwards towards the symphysis, and retain it there by the fingers; but there are in many cases a rudeness and violence in this plan, which will be easily appreciated by such as shall make the attempt, and who, moreover, will often find that they cannot retain it in the desirable place, without giving pain, and exerting so much force as to expose the os uteri to contusion or to rupture. If the woman lies on her back, the fundus uteri will retire towards the spine, bringing its axis into the proper range; and of course the plane of the os uteri will take its proper station; if this precaution be taken, the child will, in some instances, be delivered much sooner than if it should be omitted.

When we meet with patients who allow themselves to be violently agitated by the pains of labor, so as to require actually to be held, at a period when the perineum is in danger of rupture (and women are now and then so distressed as to lose all command of themselves), the best attitude is the one on the back, with the knees drawn up; in this position they are kept much stiller and quieter than when on the side. I had a woman under my care in November, 1833, who was so violent that two or three women could not keep her still; when I caused her to assume the dorsal position, she became passive enough.

To Assist the Flexion and Rotation.—I have spoken, in another place, of the dip of the occipito-frontal diameter of the fœtal head. The nearer to the middle of the excavation we find the posterior fontanel, the greater is the dip; therefore in the conduct of labors, we may exert a most beneficial influence, by increasing the dip of the occipito-frontal diameter, which brings the posterior fontanel down towards the axis of the excavation; not down to the axis, indeed, but yet not far off from it. The vertex must always, at first, be towards one of the lateral pelvic walls; but where the posterior fontanel is found quite up towards the side of the pelvis, and the anterior fontanel is at the same time within reach of the finger, we may feel assured the dip has not taken place, and the retardation of the labor may be attributed to that cause, for the chin has somewhat departed from the breast. Could we, under such circumstances, get the vertex more down towards the centre of the pelvis, the pains would be more successful. Now, the edges of the parietal bones over-riding the edge of the occipital bone, form a ledge, which gives a good purchase for two fingers, which, when applied upon that ledge, can generally draw the vertex downwards to the required position. Whenever this operation is to be attempted, it should be tried during the absence of the pains; and when the vertex is once pulled downwards, it ought to be retained in its place until a new pain comes on and enables the operator to secure whatever advantage he has gained. Should the head be placed, by this gentle method, in the desired attitude, it is as easy to conceive, as it is indeed common to witness the increased facilities it affords for the delivery.

In this case it is useful to make the womb take an oblique position in the belly. For example, suppose the vertex to be to the left and unable to dip; it is clear that if the woman should lie upon her left side, the fundus of the womb would be thrust down towards the left side, and that the vertex would have less difficulty in dipping. If it should not fall down there, it ought to be pressed down with a gentle hand.

I have always found it much easier to pull the vertex down than to push the forehead up; because, the finger acting upon the ledge above described, acts upon the longer end of the lever, of which the atlas represents the fulcrum: whereas, in an attempt to push up the forehead, so situated, the lever we use is very short—its real extremity would be the chin; but we cannot reach the chin. Moreover, when we attempt any strong force, the bones of the os frontis are so yielding, that they readily indent, and we are obliged to desist for fear of contusing the brain; the fingers, in fact, being applied near the upper edge of the os frontis, where the ossification is as yet incomplete. The same objection does not hold as regards the posterior edges of the parietalia and os occipitis, which are very firm before birth.

The labor may be retarded by the failure of the head to undergo *rotation*. It is sometimes very difficult, at the bedside, to learn why the head does not rotate in a patient, who in another labor meets with no such difficulty. I am aware that it frequently arises from failure of the dip above spoken of; but I wish now to speak of a case in which the head has sunk very low, where the dip is good, yet the rotation fails: I have on many occasions, after much doubt and anxiety, found that it could be fully accounted for by referring to the grasp of the cervix uteri, which actually bound and held the head so firmly, that it was unable to execute its pivot motion. The remedy in such cases, is patience; for as soon as all resistance of the cervix is over in consequence of the fatigue of the parts, or the acquisition of perfect dilatability, the pains will push the head down, and the inclined planes of the pelvis will make it execute its spiral or rotatory movement in the most rapid manner.

In all the cases where rotation fails for want of the requisite dip or approach of the chin to the breast, let that want be supplied by pulling down the vertex as directed, and if such gentle measures will not succeed we have the powerful resource of half the hand, which may be introduced into the vagina, and sometimes within the cervix; and which taking the head in its palm and fingers, can place the vertex wherever it may be desirable to fix it. It should be remembered, however, that a vectis is very rarely, but yet sometimes imperatively demanded for the management of such a case.

Vaginal Vesicocele.—Labors are rendered slow, painful, and even ineffectual, by vaginal vesicocele. The bladder of urine in these instances, instead of maintaining its place in front of the womb, appears to fall down below the top of the arch of the pubis, making a soft, elastic, and painful tumor there. Sometimes the depressed bladder is directed to one side of the pelvis, as in the following instance, which explains the circumstances of such a case better, perhaps, than could be done by a long dissertation.

CASE.—Mrs. B.'s labor, September 8th, 1848, 12 M. In labor since yesterday morning. Expected her confinement last month, about 15th to 20th.

She recovered from her last menstrua November 10th, 1847, and has not *seen* since that date. If we adopt Prof. Nægèle's method of calculation, and go back to October 10th, September 10th, and August 10th, which is three months, and then add to August 10th seven days, we should look for the accouchement on the 17th August. In fact, on that day she had a considerable show,—which was repeated for many days, inducing her to keep her chamber, which she has not since left. Her pains are now frequent and attended with violent tenesmus or *bearing down*. By the Touch I find the os uteri very high and scarcely to be reached—open to the size of a ten cent piece, very thick and hard; the head presents; the membranes unruptured.

Having made this careless diagnosis, and given some direction as to the conduct, and prescribed for the tenesmic distress, I saw her again in the evening about seven o'clock. The pains, it was said, had been repeated every few minutes; and upon coming into the apartment, one would suppose the child was pressing upon the perineum violently, so loud was the sound of her respiratory effort in bearing down.

She had passed the scanty urine very often; the bowels had been moved by an enema. I immediately examined, expecting to find the child's head under the arch, but was surprised to discover that it had not advanced at all since mid-day. The os uteri might be as much as an inch in diameter, and not more. While carrying the finger to the os uteri, it appeared to encounter a sort of cushion-like tumor occupying chiefly the right half of the Excavation. On the left side of the Excavation there was nothing abnormal—the finger could be pressed to the left as far as the ischial plane. Upon discovering the tumor in question, my first impression was that it was a case of pelvic enterocele like that in Dr. Bicknell's patient; but farther exploration showed that it was not in the recto-vaginal peritoneal cul-de-sac—which cleared up the diagnosis on that point. I asked again as to the urination—which had been frequent, not free.

I introduced a catheter into the urethra—but when it had advanced about two inches it stopped, nor did any urine escape. I expected to carry the point of the catheter downward and backwards into the tumor, which I now presumed could be nothing else than a cystocele, consisting of the bladder of urine, which had been crushed under the womb, and obstructed so as to be unable to discharge the whole of its contents. Finding I could not cause the catheter to advance without using imprudent violence, I withdrew it. The patient lay on the back with the knees drawn up. Introducing three fingers of the right hand far into the pelvis, when the pain was off, I pressed the palps of the fingers upon the inferior surface of the mass, and lifted it upwards towards the plane of the superior strait. Just as I had raised it partially up, there came on a violent tenesmic effort—and the urine rushed from the orifice of the urethra in jets so violent as to surprise me. In the course of three or four such jets, the whole of the urine in the bladder was expelled; the tumor disappeared, and within forty minutes, the whole of the remaining dilatation of the cervix was completed and the child delivered.

As soon as the bladder was emptied, the singular, extraordinary tenesmic efforts returned no more—but the phenomena of expulsive action were thenceforth perfectly natural and customary.

The patient, when I came into her apartment, was in a state of extraordinary excitement, representing her sufferings as intolerable; her face was redly flushed and heated, and the heart rapid and tumultuous.

This case seems to me worthy of record, first, as presenting an example of the bladder crushed beneath the uterus; second, as exhibiting the method of making diagnosis of such a case; third, as showing how it may be successfully treated; fourth, as proving that pains and distresses that contravene the co-ordinate action of the uterus in labor, being removed, the conformable play of its forces may be expected to take place; and, fifthly, as showing that where the bladder is crushed downwards below the womb in labor, it may be, for it was in this case, thrust to one side of the pelvis. In this instance, it was jammed to the right, and not at all to the left side of the excavation. In this very case, even the dilatation of the cervix was held in suspense until I relieved the bladder; whereupon the co-ordinate contractions of the womb being no longer contravened, they effected the remaining dilatation and delivery in forty minutes.

I refer the Student to p. 122 of my "Letters to the Class" for the history of a case of vaginal rectocele equally curious.

Management of the Cervix and Os Uteri.—The head has sunk low into the Excavation; the fontanel is in the proper position, neither too near to, nor too far from the symphysis, but it advances not at all; pain after pain passes with great suffering to the mother, and yet with no sensible advance of the head. What can occasion the retardation? The finger glides up behind the symphysis to the superior strait, and moves along the linea ileo-pectinea a considerable distance, showing conclusively that no disproportion exists between the head and the bony canal it is destined to traverse. All this uneasiness on the practitioner's part will cease as soon as he discovers that the cervix uteri, which he had thought to be sufficiently dilated to offer no farther considerable opposition, has ceased for a time to yield, and during every pain, takes hold of the head so as to prevent the parietal protuberances from escaping into the vagina. The proper remedy here, also, is patience; a small venesection; a large draught of some warm relaxing fluid; the fortunate occurrence of nausea; a careful adjustment of the axis of the uterus, and of that of the pelvis; or perhaps a few very powerful exertions of the auxiliary muscles in bearing down, to which the woman can be exhorted. I have often, after allowing myself to get into a fret relative to the slow progress of affairs, found all my uneasiness dissipated by a more careful examination as above, thus clearly ascertaining that no other than soft obstruction existed; whereas, from too careless an examination, I had erroneously believed that the os uteri had mounted up over the parietal protuberances of the fœtal head, and that some unknown cause of retardation prevented the due progress.

Effects of a Bad Sacrum.—The hollow of the sacrum is the essential cause of the obstetric properties of the excavation. Those properties will be present in perfection, where the sacrum is perfectly well formed and adjusted: but the sacrum may be either too little curved or too much so; and inasmuch as the rotation of the head requires for its regular and easy performance, a good curve in the sacrum, a very straight sacrum must offer impediments to that important act. Hence, a sacrum with too little curve will protract the period of delivery; and in fact, a case might arise, and such a one has arisen, where no rotation at all could take place, but the delivery, at last, occurs without this important act in the mechanism of labor—the vertex coming out under the tuber ischii: a case requiring the very extremest degree of flexion of the head. Let the Student consider a moment what process must be substituted for the rotation; the occipito-bregmatic diameter is but three and three-quarter inches, but the tubera ischii are four inches apart; hence, where the rotation fails, there must occur a greater dip, causing the occipital fontanel to take a position nearly in the centre of the pelvic canal, by which the relations of planes between the head and pelvis are adjusted, and the occipital bone enabled to pass out under the ischium, and the parietal protuberance under the pubal arch. Such a great degree of dip may be much promoted by the help of the fingers, as before stated, and by pushing the fundus uteri as far as possible to the left, which will take time. I have found it not very difficult when the head was of a medium size.

On the other hand, if the sacrum be too much curved, its apex will jut forwards towards the pubis, so as to form a sort of shelf, on which the head lies; the expulsive forces being vainly expended in impelling the head down upon this shelf or ledge. The gradual compression of the cranium, however, at length moulds it into the requisite form, and allows it to slide off the ledge, and the delivery takes place. It is to be understood, that the highly aggravated degrees of this vicious conformation involve the necessity of direct interference with some one of the various instruments employed in obstetric operations.

Influence of a Badly Shaped Pubis.—When the pubal arch is not low, but retains the character of early life, or of the male pelvis, great retardation takes place, because the act of extension of the head cannot occur in due time. Such a narrow arched pubis compels the head to continue its descent much longer than one where the arch is broad and low. It has as bad an effect as, and indeed it is equivalent to, a long symphysis pubis; for in the ordinary conformation, as soon as the occipital bone can come to apply itself to the arch, the vertex begins to rise, extension of the head takes place, and the perineum requires no inordinate degree of protrusion.

But imagine a pubic symphysis of two and a half inches, instead of one of an inch and a half, and it is plain that the perineum must go much farther down before the head can escape under such an arch.

CASE.—A patient with a very narrow arch had been under my care in two of her labors, in which, the natural pains being insufficient, I was compelled to reinforce them by the ergotic stimulation. By violent efforts of the womb and abdominal muscles, she gave birth in both cases to living children. I need not, in self-defence, say that I waited as long as I deemed it prudent, but my confidence in her strength was in vain in each instance. In 1841, I delivered her for the third time; but was obliged to use the forceps.

The Perineum.—The resistance of the perineum and vulva is, in many women, so great, as seriously to retard the delivery. I have waited six hours by the bedside, after the vertex has begun to jut out between the labia, the patient all the while suffering severe labor pains, that vainly tended to expel the head. There is nothing to be done but wait patiently after having placed the woman's constitution in its proper attitude by means of venesection; by every psychiatric resource of exhortation, assurance, encouragement, and honest promise of relief; by the least fatiguing posture of the body; by the application of mucilaginous fomentations to the genital region; by the exhibition of relaxing drinks; by emollient enemata, anodynes, and the warm bath. I consider that we have no right to apply a force, additional to one strong enough, that nature furnishes, and which it is evident must be effective if left to itself. Under such perverse resistance of the soft parts, time is required to *enable* them to acquire a yielding temper. To force the head through them by the ergot or the forceps, would be to incur the hazard of shocking lacerations of the external organs of generation, or even of the womb itself, which it is rashness, in the highest degree, to stimulate and lash into fury where the uterine contractions are already very powerful, and where they would soon effect the delivery, were it not that the external parts are unprepared to admit of it. The true principle of practice here is, to diminish the resistance, not to increase the power, already excessive, and therein dangerous. Let me be fully understood as referring, in the above remarks, only to cases where the energies of the uterus, though great and manifest, are yet unequal to the task of overcoming the resistance rapidly, and where they evidently will overcome it in a reasonable time. In other circumstances, as where the resistance is powerful and the pains poor and weak, let the just proportion be established, by means of the ergot, a glass of wine, or the forceps, between the power and the resistance it is destined to vanquish.

Case.—Three years ago I attended a young woman in labor with her first child. The process was most painful and tedious. The head was fully six hours pressing upon the perineum and external parts, under violent uterine contractions. The child was at length born, but was dead. As this was a result which I very much feared, I was extremely desirous of applying the forceps. Would it have been justifiable to use them in a case where the contractions were so strong as to lead me to apprehend that the perineum would give way under every natural pain? I thought not. It is perhaps impossible to find expressions fitted justly to set forth the tormenting doubts and anxieties of the accoucheur in cases like this; cases where he feels that he has power to terminate the sufferings of his patient, but dares not violate the injunctions of his conscience, which tells him he may not yet intervene.

When the head begins to emerge it does so by pushing away before it the perineum, which continues to cover the cranium like a tight cap. It should be remembered that the direction of the forces is parallel to the axis of the superior strait; but it is equally true that at this stage, the direction of the movement is not in the same line; the head is repelled by the curved line of the sacrum; it is driven against the sacrum, but, coincidently with Carus's curve, glides off from its curved surface towards the outlet; from which, if unrestrained by the perineum, it would escape without much extension. It *has* happened that the head has passed directly through the perineum, perforating it as if a six pound ball had passed through, without injuring the commissure of the vulva or the sphincter muscle of the anus; and there is always supposed to exist some danger of its tearing the anterior edge of the perineum, at least when that point is unsupported. Hence, the general care of writers to direct that the perineum be supported.

From the foregoing remarks, the Student will be enabled to appreciate the value of this injunction concerning support to the perineum, and to know how it ought to be executed. He knows that a folded napkin extending from the lower part of the sacrum up towards the top of the vulva, should be pressed against the parts in such a manner as to protract or continue the inclined plane of the sacrum, whereby extension of the head will be enforced, and no danger occur of its being too strongly propelled against the now thin tissues, which might be lacerated were the head not to follow the curved line of its movements.

The degree of pressure made by the hand must be proportioned to the exigencies of the particular case. It should always assist the perineum to compel the head to undergo extension; and, where the tissues yield with difficulty, so as to furnish grounds to fear their laceration, the further advance of the head may be safely counteracted for a time by firm pressure, and by advising the woman to refrain, which she should continue to do until the soft parts acquire a sufficient dilatability.

The young practitioner, and the Student, should be warned against falling into a habit of beginning too early to support the perineum. If the part should be too early pressed upon with a napkin, it might become heated, and thus lose its disposition to dilate; and it is assuredly unnecessary to sustain it, or support it, until a certain degree of extension has put it in some danger of being lacerated.

Cord round the Neck.—The head is born; perhaps the cord is turned once, or even thrice around the child's neck, which it encircles so closely as to strangulate it. Let the loop be loosened, by pulling the yielding end of the cord sufficiently to enable it to be cast off over the head. If this cannot be done, let the child pass through it by slipping it down along its body over the shoulders. Should it seem impossible to slip the cord over the head or shoulders either, it should be let alone; and in a great majority of cases it will not prevent the birth from taking place, after which, the cord can be cast off. Should the child seem to be detained by the tightness of the cord, as does happen, or in danger from the compression of its jugular vessels, the funis may be cut with the scissors, and tied after the delivery. Under such a necessity as this, a due respect for one's own reputation should induce him to explain to the bystanders the reasons which rendered so considerable a departure from the ordinary practice indispensable. I have known an accoucheur's capability called harshly in question upon this very point of practice. I never felt it necessary to do it but once.

The Shoulders.—If the shoulders should not rotate, so as to bring one of them under the arch, that motion may be given by one or two fingers, introduced, and made to act upon the shoulder nearest the pubis, so as to draw or push it into its proper place. If difficulty occur, and the shoulder does not advance, press the child back against the edge of the perineum, and that will often afford room for the advance of the shoulder, which had been thrust over the top of he brim of the pelvis by the resiliency of the edge of the perineum which is pressed against the posterior part of the child's neck, and so pushes the opposite side of the neck against the pubis. I have sometimes caused the shoulders immediately to descend, by merely pressing the perineum downwards and backwards; the shoulder, which was jammed up above the top of the symphysis pubis, slipping down behind the symphysis, as soon as the cause that pushed it forwards (namely, the pressure of the perineum) was withdrawn. Sometimes the shoulder nearest the sacrum, and at others that nearest the pubis, escapes first. The Student will readily perceive which one he ought to assist; and he will at times be compelled to try one, and then the other, uncertain which is likely to emerge first.

It is considered bad practice to drag out the body, except in very peculiar circumstances—the womb and abdominal muscles being sufficient for that end; for if it be permitted to come away slowly, we shall have a more complete contraction of the womb, and a more ready detachment and extrusion of the placenta. Therefore, it is better to leave the expulsion of the body to nature, merely removing any cause of delay that may obviate its descent and escape. Where the delay is great, and the child becomes very black in the face and the respiration is either not established or in an unpromising condition, we are fully warranted to expedite the delivery by making use of one or more fingers, fixed as a blunt crotchet in the axilla.

Soon after the child is born, the accoucheur should place his hand on the woman's abdomen, in order to learn the state of the womb.

How to treat the Child.—As soon as the child is born, lay it on its back, out of reach of the waters, which sometimes stand in a deep puddle by the breech of the mother; the child ought never to be exposed to the danger of suffocation.

Take care not to move it too far from the woman, as by an incautious, sudden movement of the child to a considerable distance, the umbilical cord might be violently stretched or even broken. Such an imprudence might even invert the womb; indeed, it is needful to be very careful not to stretch the cord suddenly, either before or after the severing.

If the infant breathes regularly, it is well; if not, blow suddenly into its face, and drop some cold spirit on the region of the diaphragm. These, and a few smart slaps or frictions, are, in general, all that are demanded. Take care that the infant be not rudely or suddenly handled. It ought not to be agitated by any violent or hasty motions. In many of the instances, life is already nearly extinct, and so, the child can no more endure to be rudely handled or shaken than a fainting girl. It is enough to see and know that the child lives—that its heart is beating and its diaphragm moving, for these are the two great motive powers of life. If the diaphragm moves, it is removing the atelectasis of the lungs and pouring the oxygen upon the blood; but oxygeniferous blood, sent forward to the brain by the contracting heart, extricates the biotic force from the neurine; that force is life made manifest in the motion it excites.

The cord should not be cut until the pulsations have ceased near its placental extremity: it would be vain to wait for its cessation near the child's body, as blood is thrown into the arteries long even after the ligature is applied; in fact, children do sometimes bleed at the cord hours after they have been dressed, if the cord has been imperfectly secured. There is no need to tie the cord twice, unless there be twins; which can always be ascertained by feeling the uterine tumor. Tie only one ligature, and that at the distance of an inch or two from the belly, and cut the navel-string, holding the cord tightly betwixt the finger and thumb. If it be not held, it will spirt the blood sometimes to a good distance, and soil the bed, or even the practitioner's clothes. Conceal the cut end of the placental portion of the cord in the napkin, that its blood may not fly over the bed; and then give the child to the nurse. There is danger of dropping the infant if it be not properly taken hold of. It should be seized with the left hand, by one or both ankles; the back of its neck ought to rest in the arch formed by the thumb and forefinger of the accoucheur's right hand, while its back lies in his palm, and the points of the remaining three fingers are under its right axilla. If held in this manner, it can by no means fall to the ground. I have seen a child taken hold of under the arms by both hands, and lifted up in a manner I thought quite insecure, considering that it is slippery with the waters or blood from which it had just been taken up.

Placenta.—In most cases, the placenta comes away in eight or ten minutes—Dr. Hunter thought in twenty minutes. The care required in regard to the placenta is considerable, for no one can say of any labor that it will end well, until the after-birth is completely discharged, and for at least an hour after that consummation. The French call the delivery of the placenta, emphatically, *delivrance*, delivery. We should always ascertain, after having given away the child, the state of the womb. To that end, place a hand on the hypogastrium, and if a hard tumor be felt there, the womb is contracted; if the womb is either not to be felt at all, or is very soft and yielding, or very large, a few gentle frictions on the abdomen will cause it to contract; and now, if a finger be passed up to the os uteri, the after-birth will be felt either in it, or just above it; if within it, let the woman bear down immediately, while the cord is tightened by pulling moderately at it. The mass will descend slowly into the vagina, either edgewise or not; if not edgewise, one edge may be hooked down with the finger, and a few efforts of bearing down will expel it from the vulva. Remember that a placenta is as large as a dinner-plate, and the cord inserted in its middle—the os uteri contracted to the size of a dollar. To pull directly upon such a cord would be like pulling off a button from your coat, instead of skilfully unbuttoning it. Such a placenta, buttoned within the orifice, should be dextrously unbuttoned by bringing its edge to the button-hole, as one would do with his coat-button.

The placenta should be received in the left hand, and turned or rolled round several times by the right hand, in order that the membranes may gather into a string or rope, so that, when they are drawn out, none of them may be left adhering to the uterine surface, where they might give occasion to putrefaction, with offensive and injurious discharges, by detaining portions of blood. A complete, clean delivery ought always to be effected, if possible. If the woman finds, the next day, that portions of membrane are hanging out of the vulva, she becomes alarmed, or at least thinks her medical man careless or ignorant. Notwithstanding that the placenta may be carefully rolled as above directed, we sometimes find that where the membranes have been very much broken by the child, or where they are extremely delicate, the cord or rope we have formed by twisting them is breaking, so that a considerable remnant of them is about to be left in the uterus, which we cannot get possession of without passing up the hand at least into the vagina. My custom, when I find the membranes breaking, is to cease pulling until I have wrapped round my rope of membranes a small rag, which enables me to spin them still more, and thus draw them entirely away: they are so slippery that the rope cannot be twisted with the fingers, but when a dry rag is wrapped round them, we can twine them, and pull them as much as we may think needful.

Unhappily, the placenta does not always come away so soon; we may wait half an hour or an hour, for the expulsion of the after-birth, and yet upon examination, repeated from time to time, discover that it has not come within reach of the fingers. Frictions upon the abdomen powerfully excite the peristaltic fibres of the alimentary canal, but their effects upon the womb are far more decided; it may be said, that when made upon the hypogastrium, they generally compel the womb to recommence its contraction—some wombs are so excitable, that a touch brings on the after-pains; frictions ought, therefore, to be instituted. The consent of parts, also, causes the womb to act as soon as the woman makes a strong bearing-down effort, to which she should be urgently prompted, if needful. When a contraction has been procured by frictions, or in any other way, it may be rendered permanent by pressure; therefore, let an assistant be properly taught to apply the palm of the hand over the uterine globe, and not take it off until told to do so. Such assistant, however, ought to be one worthy of the trust; an ignorant one might, by pressing at an inconvenient moment, indent the soft and relaxed fundus uteri and cause the beginning of an inversion of the organ. I have no doubt that some of the cases of inversion recited in the books were brought about in this way. In all those patients who habitually flood in labor, these precautions ought to be observed. When the hand is removed, a bandage should be ready to occupy its place. If the os uteri be very much closed, it is probable that the placenta will require a long time to come away; and I know no objection to a patient waiting for the spontaneous movement of the organ, where no hemorrhage, or other unusual appearance, is observed. Some writers have been disposed to assign a fixed period, up to which the accoucheur ought to wait, before he resorts to compulsory measures for the delivery. But there can be, or ought to be, no fixed rule on the subject except this one rule, namely, the placenta must be got away, as there is no security while it is left. I have never gone away from a patient leaving the placenta undelivered; never. I think I have never waited for its spontaneous extrusion more than an hour and a half, for I have always supposed that if it would not take place in one hour, there was little prospect of its taking place in twenty-four hours. I cheerfully admit, however, that cases may and do occur, in which a longer delay might be advisable. I have not met with such cases. I wish to be understood as speaking, in this place, of the placenta retained *in utero*, and not of cases where it is partly expelled into the vagina; for, when in the vagina, I think there can be no necessity for waiting at all; it ought to be removed at once. Ruysch, the celebrated Dutch anatomist, zealously inculcated the doctrine, that, as the expulsion of the placenta is a natural office, it ought not to be interfered with except upon the occurrence of symptoms making such intervention indispensable; and his authority having been deemed unquestionable, was yielded to by several physicians of eminence, who nevertheless found, after losing not a few patients from hemorrhage, inflammation, &c., that experience is the best teacher; and they therefore reverted to the custom of securing the expulsion of the secundines by artificial measures, wherever the powers of nature were incompetent to that end.

As to placenta retained by what is called hour-glass contractions, I am confident in asserting that it is always an adherent one. Where the connection of the placenta to the uterine surface has, by force of some certain inflammatory action, become preternaturally firm, the substance of the placenta acts as an antagonist to the contraction of that part of the uterus on which it sits—in fact, the placenta may be said to splint the womb, and keep its superficies extended. Now, when all the parts of the womb-fibres, except those of the placento-uterine region, are left without antagonism, they contract as usual, but the antagonized portion remains extended and splinted by the after-birth, so as to be incapable of contracting like the rest, which, by *their* contraction, shut the placenta up in a cell or cavity, which is the upper cavity of the before-mentioned hour-glass. I have never seen an hourglass contraction without adherence of the after-birth; and I take it for granted, that, as soon as an hour-glass contraction is discovered, there is also the indication to deliver, there being no reasonable hope that a spontaneous delivery will ever take place. I freely, therefore, advise the reader to deliver at once in all cases where an hour-glass contraction can be clearly made out. The operation which may be performed so as to give no great pain, requires explanation of the necessity for it, and assurances of great carefulness and tenderness in the performance. Half the hand should be insinuated into the ostium vaginæ as far as the thumb, which, being next buried in the palm, permits us to get the whole hand within the pelvis. From thence, either the whole hand, or half the hand, or sometimes the index finger alone, may be made to enter the cavity of the womb to detach and seize upon the placenta, which, when fairly severed of its unnatural connection to the uterine wall, may be removed by the hand, or left to be expelled by the contractility of the organ. It is a safe and proper conduct, however, to bring it away in withdrawing the hand, so as to let the uterus contract as much and as soon as possible.

A placenta may weigh from a pound to a pound and a half. Let the Student reflect that such a mass, if within the uterine cavity, must distend it considerably; and if he cannot touch it by passing the finger up to the os tincæ, the fundus of the womb must, of course, be high up within the abdomen. Therefore, in any case of retained placenta, he will find the fundus fully as high up as the navel. It will require, then, in order to get it, that the *hand* should be introduced: the finger cannot reach far enough.

From the dilated state of the vulva and vagina, after delivery, no difficulty stands in the way of the introduction of the hand into those parts. As it passes up, it is guided by the forefinger, which glides along the cord, while that is tightened by the other hand. The accoucheur must expect to find instances in which the os and cervix uteri actually gripe the cord; so that he is necessitated to introduce only one finger at first, then a second, and a third, which gradually conquer the resistance of the circular fibres of the os and cervix uteri, so as to make way for the whole hand, which at length is found to have entered into the cavity of the womb. But the pressure required in this operation has put the vagina, even the womb itself, on the stretch; so that were he not to resist its rise by pressing the abdomen with the other hand, the fundus would be pushed up to the scrobiculus cordis, and his arm pass inwards as far as the elbow. He ought not to allow any help, but with his *own* left hand on the fundus, force the womb downwards, towards his right hand. Let the operator always stop the womb from rising, by counteracting it with one hand placed over the top of the fundus to push it downwards towards the hand which is within.

When the last portions of the child quit the uterine cavity, expelled by the muscles of the organ, it generally happens that the placenta is completely detached from the uterine wall by that same contraction. This, however, is far from being always the case. When the womb fails to displace the placenta by force of the last expulsive effort, it does not follow that we are to expect an hour-glass contraction. On the contrary, the hour-glass is a rare event, while the continued normal adherence, total or partial, is a common one, a partial being more common than a total adherence. Yet it is probably true that an hour-glass would ultimately shut the placenta in its upper cell, in all cases where the placenta should fail to quit the surface after a few contractions. If, in such a case, there be no flooding or other symptoms indicating our intervention, we ought to wait for one hour at least. It is not wise to wait longer, and my multiplied experiences teach me that it is not rash then to proceed to the delivery of the secundines.

The cord furnishes a most convenient means of pulling out the placenta, which should never be used for that purpose without careful reflection on all the circumstances. If the after-birth is still attached, and the uterus firm, to pull at the cord is to endanger the breaking it off even with the surface, which is an embarrassing and rather disgraceful accident; but if the womb be not firmly contracted, it might be so flaccid as to be turned inside out, like a wet bladder. I have seen a womb that was turned inside out by a midwife in this way, a case of great interest, that will form the subject of a future page. To any individual who has seen one at full term, nothing would seem easier than to invert a relaxed uterus. Wherefore, no man of discretion ought to draw by the umbilical cord, without having first ascertained that the womb is well contracted; and even then, the force he may venture to employ by its means is an exceedingly limited one.

Womb after Delivery.—When the placenta is delivered a hand should be placed on the patient's hypogastrium, for the purpose of ascertaining whether the uterine globe is firm. If one forgets to do this, he will incur the hazard of leaving his patient with an inverted womb. This lately happened here to a friend of mine, who did not discover the accident until five weeks after the event. The woman suffered the greatest distress, and the greatest weakness from loss of blood, but recovered at last.

The uterus ought, to feel through the integuments, about as large as the fist; but there is great diversity in regard to the magnitude of the organ immediately subsequent to delivery. The smaller it is, the better for the patient, who, with a well contracted uterine globe, may be pronounced beyond the reach of danger from effusions of blood; In feeling for the globe of the womb, whether before or after the delivery of the placenta, we should always endeavor to ascertain that the fundus has not fallen in, making a deep concavity like that in the bottom of a junk bottle; such an indentation is the first beginnings of inversion of the womb, and it may readily be detected where the belly is loose, thin, and flabby. If, in any case, such an indentation should be discovered, the rule of practice ought to be to introduce the hand and take the placenta bodily away, or pushing the incipient inversion of the fundus back to its place, forbid the woman to make even the least expulsive effort. After the extraction of the after-birth, great care should be invariably used to make sure that the proper pyriform shape of the organ is preserved.

After-pains.—The pains which women suffer, whether before or after delivery, depend upon one and the same cause, namely, the muscular action of the womb. The organ, after delivery, grows alternately small and large for some hours; expanding to double the size of the fist when the pains are off, and reducing itself to the smallest size when they return. Every interval, or period of expansion, permits a small quantity of blood to accumulate in the cavity, which is forced out by the returning pains. The woman feels the gush of warm fluid issuing from the vulva, and is apt to say that she is flooding or flowing. An inspection of the countenance and an examination of the pulse are perhaps sufficient to indicate the course of the practitioner. If the face is not pale, and the pulse not weak or small, he will feel sure she is not bleeding too freely; but if they indicate the existence of too considerable a discharge, the amount of it ought to be ascertained with precision. There are few nurses who are competent to decide upon the case; as whether it amounts to what might be denominated hemorrhage or not. I was called in haste to attend a woman whom I found just delivered of a child; I received the afterbirth, which came off spontaneously, and observed that the sanguine discharge was very great, but the woman, although feeble, was not sunken. The uterus contracted well, and I left her in a comfortable and usual state. In about two hours I was summoned again, and found her very faint, with extremely feeble, slow pulse. Placing one hand upon the hypogastrium, I found the womb not dilated, and then inquired of the nurse as to the amount of the lochia. She assured me that it was not greater than it should be. She had examined carefully into the circumstances, and found all right. Distrusting her account, I determined to learn for myself whether a large effusion had taken place, and found an immense quantity of coagula lying upon the bed, which the nurse had either not seen at all, or disregarded. This case, which many years ago caused me great trouble and anxiety, has influenced me ever since, and now I always feel unwilling to take information at second hand upon the important subject of profuse uterine discharges. I think it the duty of the Student early to resolve to learn accurately whatever may have an injurious or dangerous tendency for the patient committed to his charge. It may be stated as an axiom in obstetrics, which has almost no exception, that a well-contracted uterus cannot bleed; and all obstetricians habitually feel secure when they find the organ hard and small. Nevertheless, the state of contraction may speedily be followed by so absolute a relaxation of the contractile fibres of the uterus, that the gentlest infusion of blood into its cavity shall distend it again, if that fluid be prevented from escaping at the os tincæ or at the vulva;—but if a coagulum should fill the vagina, or stop the mouth of the womb; or if the napkin should be too strictly pressed against the genital fissure, preventing the escape of fluid therefrom, the blood which flows into the womb will gradually distend it to that degree, that without losing a spoonful externally, the woman may effuse enough blood into the uterine cavity to expand it so as to cause fatal syncope.

CASE.—I was called, about three years ago, into the country, to assist a practitioner in a difficult labor. When I arrived, the child had just been delivered with forceps. The placenta was adherent. After waiting some time for its spontaneous extrusion, I removed it, and the womb contracted well. In the course of half an hour, my attention was attracted by a sort of gurgling sound from the bed, which caused me to draw near the woman, whom I found already quite fainted away when I approached her. She was very pale, and the pulse could not be felt at the wrist. The discharge was inconsiderable; but on placing the hand on the hypogastrium, the womb was found enormously distended, and full of blood. Two fingers were now carried into the os uteri, which was completely tamponed with a very firm clot. This I broke up and brought away, when out rushed a large quantity of grumes, mixed with fluid blood, whereupon the womb returned to its proper dimensions. She had no return of the symptoms. I could cite many examples from my case-book, of violent hemorrhages, both concealed and open, which have fallen under my notice in females where the uterus had contracted perfectly well after the delivery of the placenta. One case is so remarkable that I cannot resist the inclination to publish it here.

CASE.—Mrs. S. was delivered of her first child after an easy labor. She had a very good getting up, and on the fifteenth day walked down stairs. Some words of an unpleasant character passed between her and her husband. She became violently excited with anger; then burst into tears, and ran up stairs, where she threw herself on the bed. She was shortly afterwards found in an apparently dying state. When I reached the house, there was no pulse—great coldness, and the greatest degree of paleness. I found the womb filled with blood, and reaching above the umbilicus. Dr. Dewees was so kind as to visit this patient with me, and assist me with his valuable counsel. She recovered, but suffered a long time under the symptoms produced by this excessive sanguine discharge. This case will show the Student that even where the uterus has contracted so much as to sink down below the superior strait, it may be afterwards enormously distended by influent blood; and the reflection arising from it, though an unpleasant one, is a very just one, that, even where we succeed in getting a good contraction, we can have no sense of absolute security against concealed or open hemorrhage, in a patient whom we may have put to bed ever so comfortable or apparently safe: it is our duty always to remain within call for at least one hour after the delivery. If a whole hour passes without any such accident we may feel quite at liberty to go away. I advise every student to mark and observe this as a rule of conduct.

The influence of position in determining the momentum of blood in the vessels is well known to the profession; but there are few cases wherein it is of more consequence to pay a profound regard to this influence, than in parturient women. A uterus may be a good deal relaxed or atonic, and yet not bleed if the woman lie still, with the head low; whereas, upon sitting up suddenly, such is the rush of blood down the column of the aorta, the iliacs, the hypogastrics, and the uterine and spermatic ateries, that the resistance afforded by a feeble contraction is instantly overthrown, and volumes of blood escape into the womb and vagina with almost unrestrained impetuosity. The vessels of the brain under such circumstances become rapidly drained, and the patient falls back in a state of syncope, which now and then proves immediately fatal. I may be excused for stating here that I have never met with but one of these sudden and fatal hemorrhages in my own practice. It is, perhaps, due to the special attention I have always considered it a duty to pay to this point, that I have hitherto avoided so serious a misfortune. Surely, I have, in a multitude of persons, by a prompt attention to the state of the womb, put aside the stroke of death by proceeding without delay to empty the organ by turning out with my fingers the masses of coagula with which it was filled. If you leave your patient soon after her deliverance, and are hastily recalled to see her with an announcement perhaps that she is dying, your first duty on reaching her bedside is to examine the hypogaster to ascertain if the uterus be firmly contracted or not, and, if you find that the uterine globe is not too large, too much distended or expanded, then do not rest satisfied until by a vaginal examination you shall have learned that there is or is not a clot-tampon in the vagina.

CASE.—In conversation with my late venerable friend Professor James, upon this very subject, he informed me that he delivered a lady a few years before, after an easy natural labor. The uterus contracted well, and all things seemed as favorable as possible. As the accouchement took place early in the morning, he was, subsequent to the event, invited to breakfast down stairs, whither he proceeded, after having given strict caution to the lady on the subject of getting up. While the persons at breakfast were conversing cheerfully, and exchanging felicitations upon the fortunate issue of affairs in the lying-in room, the nurse was heard screaming from the top of the stairs, "Doctor, doctor, for God's sake come up!" He hastened to the apartment, and the lady was lying across the bed quite dead. It was found that, soon after the doctor went below, the lady said to the nurse, "I want to get up." "But you must not get up, madam; the doctor gave a very strict charge against it," replied the nurse. "I do not care what the doctor says," rejoined the patient; and thereupon arose, and throwing her feet out of the bed, she sat on the side a few moments, reeled, and fell back in a fatal fainting fit. The remarks of Dr. James, as he related the occurrence to me, made upon my mind a deep impression of the vast consequence of careful and well-timed instruction of the nurses; who, if they could have the dangers of mismanagement fully exposed to them, would surely avoid some accidents that every now and then are attended with shocking results.

Though large discharges are not apt to occur when the womb has once contracted pretty firmly—there are precautions which ought always to be observed: for example:—

Case.—I left a woman half an hour after the birth of her child. She was as well as could be desired. I gave the usual directions. In a short time her husband came running to me, in the street, where he met me, and said his wife was dying. Upon hastening to his house, I found her, in fact, pulseless, pale, and completely delirious, with a constant muttering of incoherent phrases. Upon inquiry, the following occurrences were found to have taken place. She felt some desire to pass the urine. The nurse told her to get up. "But the doctor says I must not get up." "Oh, never mind what the doctor says; it won't hurt you; get up." A chamber-pot was placed in the bed, and Mrs. F. was lifted upon it, in a sitting posture. She fainted in the woman's arms, was held up a short while, and when laid down, the vessel was discovered to be half full of blood. She had nearly died; and did suffer long and severely in consequence of this imprudent disregard of orders. When I left her, the uterus was well contracted; but the change of momentum in the arterial columns produced the hemorrhage, than which I have scarcely seen one more dangerous.

Case.—It is of the highest consequence to secure a firm contraction of the womb after delivery, in all those women who have before suffered severely from flooding soon after the birth of the child. A lady in three successive labors, of which the first occurred on the 30th of December, 1819, and the last on the 28th of September, 1824, which were rapid and easy, was brought almost to the gates of death by enormous discharges, which commenced about five minutes after the birth of the fœtus. I saw her lie pulseless, and as near as possible to dissolution in those labors. In two subsequent confinements, she took one scruple of ergot, just as the fœtal head began to emerge. This was given to her, not for the purpose of aiding in the expulsion of the child, or placenta, which had never occasioned any embarrassment in antecedent labors; but to save her from those dangerous losses, by constringing the womb permanently; and I am pleased to say that, in both instances, she experienced none beyond the ordinary amount of effusion. I could cite numerous examples of similar results. I scarcely ever omit such a precaution for any patient, of whom I am informed that she floods after delivery.

Sitting up too Soon.—As regards the danger of sitting up soon after delivery, there are some important suggestions for the Student that ought not to be here omitted.

Certain women are met with who pass through the conflict of parturition unscathed, and who are quite as competent to the performance of their daily toil on the following day as the Chief's wife who so much excited the astonishment of Hearne on his Northern Journey. I have found that many of my patients, and some in the class of what are called the "upper ten thousand," were completely destitute of all symptoms of indisposition as the halest Potawattomie or Ottowa woman. Such people might get up; and I have seen very elegant women get up and "be about" on the third day without pretence of after indisposition. Still, it is a safe rule to advise the keeping of the bed for many days, since to leave the bed is to go forth *à la chasse* for some malady. Hemorrhages, chill, prolapsions, and an evil train attend those imprudent women who leave the lying-in couch too early. A rest of nine days is a short rest after nine months of fatigue crowned by the exhausting conflict of a labor.

It is well known that the coagulability of the blood becomes greater in proportion as any hemorrhage progresses—therefore a woman who has lost during her labor forty or eighty ounces of blood has the rest of it more coagulable than it was before the flooding commenced. *Again*, fainting consists in the too little intensity of the pressure of the blood, in the brain capillaries—it is encephalic anæmia—and a woman just gone through a flooding, experiences a sensation of faintness from lessened vascular tension of her encephalon. If she suddenly assume an erect position, the tension becomes *instantly* much lessened in consequence of the gravitation of the blood. But—and this is the danger—if she faint badly while her blood is become thin and highly coagulable from hemorrhage—the scarcely moving current nearly stops in the heart, and when she comes out of the deliquium, if ever, she sometimes does so with a clot in the auricle and ventricle—she has got a false polypus in the heart—and she will surely die.

Heart-Clot.—Many women have died soon, almost immediately after giving birth to the child, or speedily after the delivery of the placenta. Some of them have perished suddenly upon rising up in bed, within a day or two, or more, after a labor attended with hemorrhage, from which, however, they were then so far recovered as to give no apparent cause for anxiety about them.

It used to be considered as an unaccountable circumstance, that some women should suddenly expire, either soon after the birth of the child, or not long after the delivery of the secundines, or within a few days subsequent to their being layed. I had noticed, on various occasions, the total want of any means of explaining such disasters, and remained as much in the dark as my compeers, until I discovered that the incident depends, most commonly, on the sudden coagulation of the blood that occupies, for the time, the right auricle of the heart, and, in some of the cases, even that which is in the ventricle and the pulmonary artery. A person who should suddenly have these cavities filled with a strong, firm clot, could hardly be expected to survive the accident, and would perish with symptoms of asphyxia; for, to choke up the way of the blood, either in the heart or in the pulmonary artery, would have nearly the same effect on the life, and give rise to nearly the same symptoms as would attend a ligation of the vena cava or the arteria pulmonalis.

My first publication on this subject, and which I consider to have made the rationale extensively known in the United States, appeared in the *Medical Examiner*, No. 51, for March, 1849, now seven years ago. Since that time, I have both seen and heard much of this sudden heart-clot, so that my views having been confirmed by my own observation and that of other physicians, I shall seize the present occasion to explain them to the student.

As the life of the blood is intimately connected with that of the vessels in which it circulates, it is reasonable to infer that the health and vitality of the former should bear a certain ratio to those of the latter.

It is beyond cavil, that the blood of an animal slowly bled to death becomes more and more coagulable as the hemorrhage proceeds, and that the last ounce that is extravasated will coagulate in a shorter time than the first ounce would. Hence, the coagulability of the blood remaining in the vessels after profuse hemorrhage is considerably augmented, and sometimes to so great a degree, that care is to be taken to avoid bringing on a fainting fit, which increases the already dangerous tendency to heart-clot.

Copious hemorrhages produce weakness not of the blood only, but of all the organisms, whose forces, indeed, depend on the crasis of the blood, forces which are lessened by the blood's weakness, while its strength is equally dependent on the living solids it inhabits. The blood is weak when the vessels are weak, strong when they are in tone, and dying when they are likewise dying. It draws its life from the living solid of the endangium, which is the only tissue to which it has any relation of contact. To withhold from the blood this vascular life-force, is to cause the blood to die by coagulation; for when the nervous mass no longer influences the blood through its endangium, it must die—its coagulation is its death.

If a woman loses, by flooding, a very great quantity of blood, the vessels soon become as full as they were previous to the accident, but the blood has become hydræmical or watery, and incapable of taking up in the lungs, and delivering over to the body, a suitable sum of oxygen. Hence the propensity to faint after hemorrhages; and hence the danger of rising up from a recumbent position. If the patient have become ever so hydræmical, and yet keep the head low, she will hardly faint, for, while she is down, the encephalon contains its full proportion of the watery blood, which, poor though it be, is still equal to the wants of the economy, if the woman but keeps her head as low, or lower than the trunk. But if she rises up and sits, or stands on the feet, then the encephalon becomes anæmical, and the lessened tension of the brain allows her to fall down in a fainting fit.

In an ordinary state of health, a fainting fit may be brought on by various causes, as mental emotion, a sudden nausea, &c., and it is not a dangerous incident, because the blood is strong, and speedily restores the suspended innervations. But where the blood is so weak that it is necessary to keep the head as low as the trunk to avoid fainting, it is very dangerous to faint badly, because the blood, already excessively reduced in strength, and prone to coagulation, is likely to become concrete if it but come to a stop in the auricle.

Let a woman, who has lost by flooding, say 150 ounces, bring on a bad fainting, by sitting or standing up, and she will seem quite exanimate. All motion of the muscles is suspended. It is a question whether she is breathing or no, and the pulses of the heart have almost ceased, while the radial artery has wholly ceased to beat. If now, this dangerously coagulable blood continues to ooze rather than flow into the right ventricle to slowly fill it, lingering as if doubtful whether to move or rest, it may die there, in the heart, because the heart being scarcely alive and most of the vessels quite still, they are without nervous force to be inducted into the blood. The blood dies in the heart's auricle by coagulating there, just as it would in a cup or vase. If the woman in such a state should now be aroused by any means, the heart will recommence its pulsatory motion but can not expel the clot that has been moulded by its cavity. The auricle, the ventricle and the pulmonary artery, filled with an immovable coagulum, which stops off the pulmonic circulation, causes the woman to experience what is called want of breath. She breathes, indeed, and breathes violently, with greater and still greater effort, but can get no oxygen out of the circumambient air, because the lesser circulation is cut off by the clot, which acts as effectually as any ligature, and she must die.

There is not, in the whole field of medical experience, a more pitiable sight than that presented by some of these heart-clot cases. The distress is truly inexpressible, and the gestures as well as the voice are fit to melt a heart of adamant. Those are to be esteemed the most fortunate in whom the clot, when it does come, is so great and strong as to preclude the possibility of any further movement of the heart, for such persons die on the spot; but in such as form a smaller clot, the efforts of the heart to dislodge or expel it from its cavities are terrible indeed; small quantities of blood only can be poured into the auricle, and pass onwards between the clot and the walls, into the pulmonary circulation. The diaphragm redoubles its exertion to pour over the scanty rill a copious flood of oxygen, which the hydræmical stream can no longer take up and carry forwards, so that the tissues and the whole brain and cord are left in fatal destitution of the life-giving reagent.

Should an instance occur so threatening as to lead to the greatest apprehensions of a fatal result, it may be still possible, by wise precautions, to indulge hopes of a recovery; which will depend upon the size of the clot formed during the state of fainting. A clot that should quite fill the whole cavities must preclude the possibility of any recovery; whereas, a smaller one would not prevent the blood of the cavæ from entering into, and being expelled from the heart, but with difficulty and imperfection depending on the magnitude of the clot. In the case of the Princess Charlotte, whose death within a few hours after the birth of the child cast a deep gloom over the whole British empire, there is reason to believe that a clot in the heart brought her existence to an almost instant close. We have a clear relation of the circumstances attending that deplorable occurrence in a letter from one of the physicians who was summoned to Osborne House at the time of her lying-in; and I shall make use of the present opportunity to lay it before the Student, that he may consider whether or no her death should be accounted for by the supposition of a sudden heart-clot. Dr. Sims's letter to the late Dr. Joseph Clarke, of Dublin, was originally printed in a *Short Sketch of Dr. Clarke's Life*, by his son-in-law, Dr. Robert Collins, Master of the Dublin Lying-in Hospital, and author of an important work on Midwifery. Dr. Collins says it is the only authentic account of the case that has been published. I copy the letter from Dr. Collins' short sketch, &c. The letter is as follows:—

LONDON, *November* 15, 1817.

"MY DEAR SIR: I do not wonder at your wishing to have a correct statement of the labor of Her Royal Highness, Princess Charlotte, the fatal issue of which has involved the whole nation in distress. You must excuse my being very concise, as I have been and am very much hurried. I take the opportunity of writing this in a lying-in chamber.

"Her Royal Highness's labor commenced by the discharge of the liquor amnii about 7 o'clock on Monday evening, and pains followed soon after; they continued through the night and a great part of the next day, sharp, short, but very ineffectual. Towards the evening, Sir Richard Croft began to suspect that the labor might not terminate without artificial assistance, and a message was dispatched for me. I arrived at 2 on Wednesday morning. The labor was now advancing more favorably, and both Dr. Baillie and myself concurred in the opinion that it would not be advisable to inform Her Royal Highness of my arrival. From this time to the end of the labor, the progress was uniform, though very slow, the patient in good spirits, pulse calm, and there never was room to entertain a question about the use of instruments. About six in the afternoon, the discharges became of a green color, which led to a suspicion that the child might be dead; still, the giving assistance was quite out of the question, as the pains now became more effectual, and the labor proceeded regularly, though slowly. The child was born, without artificial assistance, at 9 o'clock in the evening. Attempts were for a good while made to reanimate it by inflating the lungs, friction, hot bath, &c., but without effect; the heart could not be made to beat even once. Soon after the delivery, Sir Richard Croft discovered that the uterus was contracted in the middle, in the hour-glass form, and, as some hemorrhage commenced, it was agreed that the placenta should be brought away by introducing the hand. This was done about half an hour after the delivery of the child, with more ease and less loss of blood than usual. Her Royal Highness continued well for about two hours; she then complained of being sick at stomach, and of noise in her ears; began to be talkative, and her pulse became frequent, but I understand she was very quiet after this, and her pulse calm. About half-past 12 o'clock, she complained of severe pain at her chest, became extremely restless, with a rapid, irregular, and weak pulse. At this time I saw her for the first time, and saw immediately that she must die. It has been said we were all gone to bed, but that is not a fact. Dr. Croft did not leave the room, Dr. Baillie retired about eleven, and I went to my bedchamber and laid down in my clothes at twelve. By dissection, some bloody fluid (two ounces) was found in the pericardium, supposed to be thrown out in *articulo mortis.* The brain and other organs all sound except the right ovarium, which was distended into a cyst, the size of a hen's egg; the hour-glass contraction of the uterus still visible; a considerable quantity of blood in the cavity of the uterus; but those present differ about the quantity, so much as from 12 ounces to a pound and a half; the uterus extending as high as the navel. The cause of Her Royal Highness's death is certainly somewhat obscure; the symptoms were such as attend death from hemorrhage, but the loss of blood did not appear to be sufficient to account for a fatal issue. It is possible that the effusion into the pericardium took place earlier than what was supposed, and it does not seem to me to be quite certain that this might not be the cause. As far as I can judge, the labor could not have been better managed. That I did not see Her Royal Highness more early was awkward; and it would have been better that I should have been introduced before the labor was expected; and it should have been understood that, when the labor came on, I should be sent to, without waiting to know whether a consultation was necessary or not. I thought so at the time, but I could not propose such an arrangement to Croft. But this is entirely *entre nous.*

"I am glad to hear that your son is well, and, with all my family, wish to be remembered to him; we were happy to hear that he was agreeably married.

"I remain, my dear Doctor,
"Ever yours, most truly,
"JNO. SIMS.

"P. S. This letter is confidential, as, perhaps, I might be blamed for writing any particulars without the permission of Prince Leopold."

I believe that few persons die with scarlet-fever, or smallpox, or consumption, who are not hurried to the grave by means of coagula formed in the heart, late in the progress of the cases, in consequence of the debilitation or lessening of that inducted-life that passes from the vessel to the living blood. I have many times, in the closing scenes of pulmonary consumption, and other lingering, and some acute maladies, perceived, from the *running* and fluttering pulse, and the augmented respiratory distress, that the last fatal blow was struck by the formation of a heart-clot of greater or less size.

But these coagulations, that ordinarily take place in the last days of lingering chronical disorders, are different from the sudden and blasting power of the same accident in our midwifery practice.

I cannot doubt that the lady whose case I have related as having been under Dr. James's care, must have died from the coagulation of the blood in her heart. A mere deliquium is recovered from very soon after the body is placed in a horizontal posture. I should think that a fainting fit could hardly prove fatal *per se;* but, if a heart-clot should be formed during the deliquium, it seems unlikely that the blood could again move in its circle. No examination was made of the dead body of Dr. James's patient. No one knew anything of sudden heart-clot. She did not die with hemorrhage. What was it that destroyed her life? what could have destroyed it so suddenly save a deliquium, during which the heart filled with a solid clot, that precluded the possibility of re-establishing the circulation, the oxygenation, and the innervation of the unfortunate lady?

Bichat has taught us the important truth, that man cannot die save by the cessation of life or power in the lungs, or in the heart, or in the brain. By lungs, he means oxygenation of the living mass. By heart, he means the sanguine circulation; and by brain, he means the nervous mass, particularly the nervous mass of the medulla oblongata, in which essentially resides the innervative force of the respiration, and so, the oxygenating force. Man must, therefore, die by the brain, the heart, or the lungs. It is to the last degree improbable that Dr. James's patient died *solely* because her brain ceased to evolve nervous force; but, if it did not wholly cease to do so, it must have continued to be the cause of some motion, everywhere within. But if, as I suppose, the heart became instantly filled with an immovable clot, so that it could no longer receive nor discharge any blood, the nervous mass would die as soon as the last remaining atoms of oxygen in its capillaries should have become exhausted: for the function of the capillaries is to take the oxygen out of the blood which is thus converted into venous or black blood. Dr. James's patient died by the heart, as do all those who have the misfortune to form a heart-clot of considerable size.

I have had the unhappiness to witness several fatal terminations of puerperal eclampsia. In the paroxysms of this sort of convulsion, the patient's face ordinarily grows darker and darker, and the tongue and lips blacker and blacker, as the paroxysm goes on, until the pulse almost ceases to be felt; the respiration becomes nearly suspended, and at last the patient lies still. This scene, at the greatest height of the struggle betwixt life and death, is one of almost complete asphyxiation; the innervations have become so reduced that the physician is led to look with an anxious eye to see whether or not life has become wholly extinct.

If death does not supervene, there comes a slow recuperation of the forces. Now, if the patient rises upon her elbow, or attempts to escape from the bed (and it is sometimes very difficult to hold her down); if she stares wildly about her and breathes with difficulty or violence, she will surely die; and that, because, during the extremest intensity of the late asphyxiation, a soft clot has filled the right auricle, ventricle, and pulmonary artery. I have not seen such a patient, so struggling and so breathing, escape from the fatal termination. Indeed, it would be difficult, *à priori*, to imagine a condition more likely to lead to the heart-clot than that of a woman in a violent eclampsia, especially if an unmeasured use of venesection should have been employed.

CASE.—A lady was confined, and with a natural labor, giving birth to a healthy child at term. She had lost a good deal of blood with the expulsion of the placenta, which left her weak and pallid. The physician directed her to be kept quiet, so that she had a good day and following night. On the following morning the physician found her in all respects as well as could be wished. Very soon after he had withdrawn from her chamber, she became alarmingly ill and he was sent for, and returned, having been absent about one hour. The pulse was now extremely frequent, weak, and small, and it continued so until her death, which took place on the 18th or 19th day. It was upon the 18th day that I was invited to the consultation, and at once formed the opinion that she had a heart-clot, as the cause of all her dreadful symptoms, and which acting as a tampon of the heart, deranged the circulation, respiration, and innervations of the dying lady. After her decease, which occurred the next morning, a white, fibrinous coagulum was found in the right auricle, nearly filling it and projecting through the tricuspid valve into the right ventricle; the tail of the clot was whipped into cords by the threshing action of the chordæ tendineæ of the ventricle. The pleura of the right cavity contained a large quantity of serum.

When the physician left his patient's chamber on the morning of the attack, she was well enough; when he returned, after an absence of only one hour, he found her alarmingly ill. She had lost blood in the labor. He had no sooner gone than the nurse took her up, and sat her upon a vessel in bed to pass the urine. She fainted; the blood coagulated in her heart. She did not die outright, but carried on an imperfect circulation outside of the clot, and betwixt it and the walls of the heart. The red matter of the blood was gradually squeezed out from the clot and hurried into the pulmonary artery, together with numerous fragments of the remaining mass of immovable fibrine. Such concrete elements of the blood could not possibly pass through the pulmonic capillaries; whence there arose pulmonary obstructions, pneumonia, pleuritis, and hydrothorax, as the last consequences of the heart-clot. So that she died about the 19th day.

Towards the end of the year 1848, a primipara gave birth to her child. She was a tall, slender, and very delicate woman. The placenta was not removed. She lost a good deal of blood; probably a large quantity. Between forty and fifty hours after the birth of the child, I was called in, and removed the placenta from the grasp of the cervix, which alone detained it. It was so putrid that the stench of it could not be removed from my hand, by any means that I could employ, for full twenty-four hours. She was pale, and her pulse was somewhat frequent, but not enough so to annoy me. The next day I found her *comfortable;* the milk had come, and she was doing well, though very pale. On the seventh day she was put into a chair and set before the fire. Immediately she fell sick, was put to bed very ill, and I being hastily called, told her friends that she had formed a heart-clot, because she had been imprudently taken out of bed, set up, and thus made to faint. In that fainting fit the blood lost the vital induction, and coagulated as it died. She died, as any woman may be expected to do who is so treated, under such circumstances of debility and exhaustion.

The state of fainting is one that I consider to be dependent always upon anæmia of the encephalon; for, whenever the vascular tension of the parts contained within the skull is suddenly and considerably diminished from what cause soever, faintness comes on, and the individual seeks for or falls into an horizontal posture, in order to restore the plenitude of the brain-capillaries. I can form no conception of a fainting fit occurring during the existence of an encephalic hyperæmia.

To raise a woman up, who within a few days past has sustained a great loss of blood, is almost inevitably to bring on a deliquium animi. Now, if the opinion be a sound one, and I believe that it is so, that precedent losses of blood increase the tendency of that fluid to coagulate, it follows that, to take a woman under such circumstances out of her bed, and make her sit up, is to expose her to the risk of forming a heart-clot that shall instantly manifest its presence by a wild feeling of suffocation and all the distressing manifestations of an insupportable asphyxia. Often, very often, such a heart-clot is immediately fatal—the patient dying as suddenly as if a grape-shot, instead of a clot, were lodged in one of the pulmonary auricles or ventricles.

Monthly nurses, and the ordinary companions of the sick, like the public at large, know nothing of these things; which yet are so plain and so undeniable, that at least every Student of Medicine ought to be concisely acquainted with them.

Let me recommend the perusal of the following interesting case to the Student. The facts as they occurred were intensely interesting to me—and I wish that I were possessed of some art of picture-writing by means of which to reproduce the scene before the mind of the reader; and that he might see it in all its force as I did at the time of its occurrence.

CASE.—A lady, the mother of four children, after having been considerably excited by certain circumstances in her domestic relations, was attacked with symptoms of labor in the afternoon. She sat all night in an arm-chair, and did not sleep even for a moment. At 5 A. M. she placed herself upon the bed, and the child was born in half an hour. The placenta came off well, and nothing was left in the womb, which was found firmly condensed. In the course of an hour after this, she was seized with a copious hemorrhage. The vagina and womb contained large coagula that were turned out by the physician, upon which the hemorrhage ceased, and she was pretty well, although she had lost by estimate some thirty ounces. The accoucheur remained near his patient from half past six, when the hemorrhage ceased, until after 10 A. M., and then bade her good morning, and left her *very well*. At midday, and throughout the following night, she continued very well. At half past nine on the next morning, at his visit, he found her as well as could be wished, having no pain nor any appreciable indisposition save those symptoms appertaining to a healthy *accouchée*. The pulse was about 75; she was quite well.

The physician took his leave of her at 10 in the morning.

Being summoned to her, he came to her chamber again at 1 o'clock, and found her apparently nigh unto death: the pulse 164, feeble and thread-like; the hands cold; but the respiration, repeated, with long intervals, seemed to depend solely on the exertion of the will. The respiratory acts were performed with great violence, and without rhythm; she had lost no more blood, and there was no coagulum either in the womb or vagina.

The physician—it was Dr. Yardley—requested me to visit with him, and I arrived at 3 P. M. She supposed herself to be moribund; and still breathing solely by her will, and without organic rhythm, asked me, a stranger, with words broken by the occasional forced aspirations, "Sir,—do you—think—I shall be—alive—in half an hour?"

It would be difficult to conceive of a greater physical distress than that which was now endured by the dying lady. Every respiratory act was attended with an agonized sense, and with pain at the end of the sternum, as in angina pectoris. I auscultated the heart and the lungs, and sought by percussion to discover the state of the lungs and pericardium. I could detect nothing to explain the curious phenomena. I examined the abdomen, and employed the Touch to explore the pelvis. I was informed that she sat up in bed to make water, soon after the Doctor had left her at 10 o'clock, and that she was immediately thereupon seized with this illness. At once, I perceived that the deliquium had allowed a clot to form in the heart, and that it must prove as fatal as it would if it were a bullet instead of a coagulum lodged there. Indeed, I could not come to any other conclusion, for I said, at 10 o'clock she had 75 pulsations, at 1 o'clock, 165 pulsations. There is no pathological principle could bring about so sudden and great a change in the pulse, the respiration, and temperature, except some mechanical obstruction, such as a clot or tampon filling up the heart.

Such a clot, occupying the auricle, ventricle, and pulmonary artery, can never be taken away. Its influence on the circulation is equal to that which would be exerted by ligation of the cava, leaving only a small aperture for the transmission of a very little blood to the lungs. This lady is not dead already, because she still urges a very little blood onwards to the lungs, and which finds its way betwixt the coagulum and the walls of the heart. But the quantity thus propelled is insufficient to take up an amount of oxygen equal to the demands of the nervous system, and hence, she makes these violent and voluntary efforts to breathe and to obviate the asphyxiation. Her *instinct*, not her knowledge, teaches her that the more perfectly she can oxygenate, even the small stream that still remains to her, the less will she perceive the sensations arising from her cyanosis, or approaching complete state of asphyxia.

I thought it might be possible to restore the organic rhythm of her respiration, at least for a short time; and that, if that could be done, she would be greatly comforted by it. Hence, I stood before her and asked her to look at me, and exactly imitate the acts of respiration I was about to perform before her.

Accordingly, she fixed her eyes upon me, while I, by a forced aspiration, inhaled perhaps 150 cube-inches of air, which she did in like manner; I then repeated the aspiration, which she also did for more than a minute, when I ceased; she now breathed with rhythm, and without the intervention of her will; in short, she was greatly comforted, and had not from that time until her death any more of the purely voluntary respirations that constituted the most shocking spectacle of the whole scene of her sufferings.

Let the Student consider what must be the result of such a mechanical obstruction in the heart, as this I have here supposed. The systemic auricle and ventricle and the aorta are unaffected, at least directly; nothing prevents the easy outflowing of their blood; nothing prevents the circulation from flowing in on the cœliac and the mesenteric arteries; but the capillaries in which they terminate can no longer deliver over all the blood they receive, because the clot in the heart is equivalent to a ligation of the inferior cava. It is to be expected, therefore, if the patient should survive for a few hours or days, that the aqueous elements of the blood must largely escape, by exosmose or otherwise, from the mesenteric and intestinal capillaries, and fill the peritoneum with water. In one of the cases I have herein related, the pleura was filled, because, I suppose, the minute fragments of the concreted blood had been driven into the lung capillaries, and so caused the hydrothorax through a pulmonary obstruction. Here, when the fibrinous clot was unbroken, the effusion fell into the peritoneal sac; and the clot must have acted as a complete tampon, since not only were the right pulmonic cavities quite full, but the clot also extended far within the pulmonary artery itself. Twenty-four hours after her death, which took place some thirty hours subsequent to the occurrence of the accident, I found both the right auricle and ventricle, as well as the pulmonary artery, filled with a whitish-yellow, chicken-fat colored coagulum. One might well feel surprised to find that such an obstruction should not have proved instantly fatal. Let the Student here observe that the clot was not one of those dark euthanasial coagula, that are commonly met with in the heart, when examined after death from ordinary causes. Had it been even a firm but dark clot, I should have concluded that it was formed during the moribund state of the subject. On the contrary, whenever the clot consists chiefly of the fibrinous portion, and is of a yellowish, chicken-fat hue, it must be assumed to have been formed a considerable time before the death struggle of the patient. Its whitish-yellow tint proves that the red matter had been long before completely pressed out of and separated from the fibrine. These coagula have been called false polypi of the heart.

I have had so considerable an experience in these matters, that I could relate, in this place, many other instances of persons in whom heart-clot was suddenly formed, but I must abstain for want of space from such remarks in the present volume. Besides, I am content with having, in the foregoing, called the attention and excited the reflection of the Student, as to the case, and with having put him upon his guard against the most real and perhaps only danger connected with deliquium animi. After having read these remarks, I venture to hope that, in all cases of dangerous uterine or other hemorrhage, he will not be so blind to the circumstances, as to allow his patient to be taken out of the horizontal posture, until he shall have become well assured that a deliquium animi cannot come on to arrest the movement of the blood in the pulmonic heart, so as fatally and instantly to fill the cavities with this heart-clot. Several authors have spoken of heart-clot; but I am not aware that any one has heretofore set the case in such a light as that in which I have attempted to place it. There is a very clever *resumé* of the subject now before me in a pamphlet which was an inaugural dissertation *de Polypis Cordis*, &c. &c., presented at Halle in 1821, by Dr. John Valentine Deegen, of Croppenstadt, near Halberstadt.

Tampon Never.—I repeat the opinion already expressed, that the blood that issues from the placental surface of the womb after delivery at Term, ought to be permitted to flow freely out from the vagina. After it is effused, it is of no use to the woman. What is the reason that a woman does not bleed to death after the placenta is detached? It is not because a coagulum is formed, by which the effusion is arrested. She is saved by the condensation of the uterine tissue which, by its coacervation, is not only sufficiently diminished in volume to close the small orifices of the vessels on the placental surface, but even to close the largest sinuses that may be opened during the Cæsarean section, or in extensive lacerations of the womb. I saw, in a Cæsarean operation, the scalpel open the uterus immediately over the placenta—an incision large enough to permit me to extract the child with sufficient facility. The cut was, of course, through the most vascular part of the organ. I need not say, that the blood bubbled up from the incised surfaces very rapidly; but it wholly ceased to flow as soon as the placenta was removed from the womb, so as to permit that organ to contract. The condensation of the womb, in contracting, shut up the cut vessels as completely as if ligatures had been applied to them. I repeat again, that a very firm clot, shutting the mouth of the womb, may serve as a tampon which shall wholly prevent the escape of blood from the cavity, which expands as it continues to receive the effusion, until the womb becomes fully as large as at the sixth month; and the larger the womb, the more capacious its vessels. Such clots should be broken up, and removed. They are as dangerous as, but not more so than the artificial tampon, when used after delivery at term. I have never used a tampon after delivery at term; but I have seen them used, which came very near causing the patient to sink, by detaining the effusion within the cavity. The principle is false, and the practice dangerous, which resorts to such a mode of arresting uterine hemorrhage, at term; he who resorts to it, does so under the ignorant presumption that uterine, like chirurgical, hemorrhage is to be arrested by coagulation of the outflowing blood. If it should be said here, that women very commonly do discharge utero-morphous clots after delivery, I admit the fact; but I insist that but for a sufficient degree of irritability in such uteri, the clots would become so large as to require for their formation a wasteful, and even dangerous or fatal extravasation of the vital fluid. Strong uteri never permit them; weaker ones allow pretty large ones to be formed, and very feeble wombs fill until the woman faints or dies.

Turn out the Clot.—I should feel happy if I could impress upon the mind of the Student, in such a manner as to make it ever present to him when the occasion demands, that the only certain mode of arresting uterine hemorrhage is to empty the womb and cause it to contract. If a woman have alarming discharges of blood before the delivery of the child, let him take away the child, if he can. If she bleed before the after-birth is withdrawn, let him withdraw it. If she bleed after delivery, let him introduce his fingers into the uterus and break to pieces the firm coagula that he will find in it, or in the vagina; and then by frictions of the hypogaster, or by cold, by pressure, by ergot, and by all the means in his power, let him compel the womb to contract; then, and not until then, will his patient be safe. He should always turn out the clot, if the patient is sickened by it.

The weakening effect of a sudden removal of pressure or support from the contents of the abdomen, is noticed not only in labors, but in tapping the abdomen for dropsy. It is always deemed necessary, in tapping very distended persons, to pass a broad roller round the abdomen, so as to constrict it in proportion as the water flows off. In cases of paracentesis, where this precaution is not observed, the patient is very apt to faint, and evidently from the same cause I have mentioned, namely, the want of pressure on the contained organs. I had occasion, more than two years ago, to verify this principle in a case. A young woman, excessively distended with ascites, was tapped; the water flowed off very rapidly; in proportion as it escaped, I tightened the bandage, and she made no complaint of faintness. In order to test the effect of relaxing it, I withdrew all pressure for a very short time, the water still flowing, and she immediately began to grow sick and faint; which symptoms ceased as soon as I renewed the pressure with the bandage. It is with the greatest confidence, both as to its necessity and efficacy, that I therefore recommend, that a bandage should be early placed around the abdomen of such patients as are prone to fainting after delivery, as the compression, all things being thus ready prepared, may be applied soon after the birth, and without disturbing the patient.

It is well worth the Student's while to bestow some sober thought upon the subject of the binder for a newly delivered woman. As a general precaution, it is doubtless a laudable one to bind up the weakened and exhausted abdominal region. But, it is questionable as to how long it should be used. Dr. White, of Manchester (*Treatise on the Management of Preg. and Lying-in Women*), says very properly, at p. 116, "Much mischief is often done by binding the belly too tight. If there be any occasion for support, a thin napkin pinned very slightly around the waist, is all that is absolutely necessary, and the sooner this is disued the better." Certainly after the first days of the confinement, it is not to be held necessary as a preventive of syncope or hemorrhage; nor has it any special usefulness beyond the doubtful one of restoring the woman's shape. But as to this, I think that Asdrubali is very correct in his assertion, that it cannot at all restore the figure, whose restoration depends upon the vital contraction of the muscular and other tissues that have been relaxed by the gestation. I fear that much of the too general complaint of prolapsus and retroversion of the womb among American women may be attributed to the use of bandages worn so tight, and so long, as to drive the recovering uterus to the bottom of the pelvis, or even overset it backwards into the hollow of the sacrum. Dr. A. F. Hohl, *Lehrbuch der Geburtshülfe*, 8vo., Leipzig, 1855, says, at p. 1113, "The application of a binder for the abdomen, with a view to preserve the shape, to obviate the sense of emptiness in the belly, or to prevent fainting or flooding after delivery, we have by experience found to be unnecessary as long as the woman lies in bed."

Diet.—The diet of a woman recently delivered, ought to be very light, and of easy digestion. Tea, bread, gruel, vegetable jellies, and panada suffice, and are the safest materials during the three or four first days of the accouchement. Circumstances may demand a more liberal allowance; but for persons who have small lochial evacuations, or who are of an excitable constitution, the simplest elements of nutrition only should be prescribed. For a surgical patient, both before and after the completion of the operation, a regimen is deemed of vital importance; and yet the shock to the constitution, and the irritative influences of the wound, in severe or capital operations, being not greater than those developed by many instances of labor, are not dietetic precautions equally proper, then, in both cases? In addition to these considerations, it ought to be remembered that, during the months of gestation, the fluxional determinations have been towards the uterus; but now the wave of vital fluids is marching towards another set of organs, and great disturbances are, many times, occasioned by this mutation of directions. The effort of the constitution produces fever, which commences simultaneously with the irritation of the mammary glands; but, happily, when those glands are enabled to throw off an abundant secretion, the whole constitution is relieved by the evacuation, and the fever undergoes a crisis, as well marked as that of a bilious remittent, or any other febrile disorder that goes off by a profuse diaphoresis or diarrhœa. Let the body, then, be prepared for this fever, by a correct course of diet; and when that crisis has been completed, much of the hazard of an accouchement will be already over-passed, and a reasonable indulgence in stronger food becomes safe and proper.

Suckling.—The child should be put to the breast as soon as the mother has recovered sufficiently from her fatigue and exhaustion. This is a natural course—it is, therefore, the best one; for by the act of suckling, the new determinations, about to arise, are directed to, and restrained within their proper bounds: the vital wave ought to come hitherto, but no farther. Such a course is useful for the child, which generally procures, from the earliest lactation, some saline fluids that have a favorable influence on its digestive tube; and for which ought not to be substituted that pernicious compound, molasses and water, which every child in the country is doomed to swallow, at the cost of a sour stomach and flatulent bowels, displayed in the almost universally resulting symptoms of colic, green stools, and vomiting. The antediluvian mothers had no molasses and water for their children, who lived nevertheless, a thousand years. Certainly nothing can be more conformable to the dictates of nature, than an early application of the infant to the mother's breast. If we could suppose a woman in a state of nature, to be delivered alone, under the shade of some primeval forest, and unsuspected observe her conduct, we should witness the instinctive movements and promptings of nature, that would far better guide us in the management of such affairs, than the crude conceptions of those who are ever ready to boast of the excellence of art or skill over the sure suggestions of instinct. Such a mother would soon be aroused from the weakness and languor that succeed the pangs and throes of childbirth, by the cries of her helpless offspring. She would take it, as soon as a little returning strength should permit, into her arms, and the newly-born child would probably not nestle a moment on the maternal bosom, without finding the source of its future aliment: the very anatomical structure, both of the maternal arms and breast, and the instinctive motions of the child's head, would bring its lips speedily in contact with the nipple. But we, wiser than our great instructress, often keep the new-born child away from its natural resting-place, and deprive it of the most appropriate nutriment for two or three days, in order to eschew sore nipples, or to propitiate some other imaginary evil; while we allow the breast to fill almost to bursting, and actually to inflame from distension, before we admit that preparation to be complete, which our presumptuous interference, in this manner, vitiates and troubles. The child ought to be put to the breast as soon as the mother is strong enough to take it.

Medicine.—It is a good custom to give an aperient medicine on the third day, or about seventy hours after delivery; while, in most cases, it is safest to defer the administration, at least up to this period. The perturbations of vital action in the abdominal viscera, occasioned by medicines administered too early, are observed to result in symptoms of congestion, and of peritoneal fever, in not a few instances, particularly where an epidemic tendency to the latter malady exists.

It should be well understood in the lying-in apartment, that no medicines are to be given to the mother or the child, without the sanction or advice of the medical attendant. In our part of the country, it is exceedingly common for the nurse to take upon herself the function of prescriber, and administer a dose of severe cathartic medicine, upon her own responsibility; which, however great and important she may deem it, remains after all, with the physician. He it is who bears the burden, and undergoes all the trouble and anxiety and responsibility of the management. He ought, therefore, always to direct that no interference with his rights should be suffered to take place. There are many reasons why he should be the sole director of the case; for it is not a matter of indifference what particular article is selected, any more than it is of little consequence at what moment the medicine (if any) should be administered.

Castor oil is the article in most request for this period of the confinement; and in a dose of half an ounce operates sufficiently well. Where the castor oil is particularly disagreeable, a proper quantity of magnesia and rhubarb; of infusion of senna; of Epsom salts; of Seidlitz powders, may be substituted; but, in general, the oil is to be preferred, because of the great certainty and moderation with which it operates on the bowels.

Lochia.—The lochial discharges grow gradually less abundant, and of a paler color. The tone of the womb itself must determine, in a great measure, the duration and amount of the discharge. It disappears in the third week, and sometimes earlier. Not a few women continue to have a show in the fifth week; and, in fact, the Jewish women had their purification at the fortieth day, which probably might be founded on observations as well suited to the inhabitants of this country as those of the Holy Land.

Etherization.—In speaking of the various points in the Conduct of a labor, I cannot well eschew to say something upon the employment of those anæsthetic agents whose recent irruption into the domain of Medicine and Surgery has been so sudden, violent, and overbearing.

To avoid altogether any notice of these agents would have been more consonant with my taste as well as with my views of medical duty; but as I feel that those who may please to have this book will surely expect to find a record of my opinions on anæsthesia as an obstetric resource, I feel constrained to overcome my reluctance to say anything concerning it.

In Philadelphia, the use of ether and chloroform in Surgery and Midwifery has made no great progress, notwithstanding the very numerous reports upon the benefits derived from those agents in

Europe and in parts of the United States. Some of our surgeons in this metropolis have applied the ether inhalation in their surgical cases—and some persons in labor have likewise been rendered insensible to their pain by breathing the vapor of chloroform or ether. I am not able to say in how many instances this recourse has been had here; but I should suppose that not fewer than some thousands of women have been subjected to it on account of labor; and I believe the practice does not become much more common and general in our community; and that not a great many more women in labor will have been etherized in 1856 than in 1850–51.

I do not feel inclined at all to deny that there may be instances of severe suffering for women in labor, that ought to be mitigated or even wholly obviated by casting the woman into the profound anæsthesia of etherization. But what I do desire to say is this, viz: that, having carefully studied the reports upon etherization and chloroformization, whether those of this country or those produced in Europe, I remain as yet unconvinced—either of the necessity for the method, or of its propriety as an ordinary practice.

1st. As to its necessity in ordinary cases of parturition. The average duration of labor is four hours, and I have shown at page 293 that the number of labor pains is about fifty; and that they last, each about thirty seconds, so that the parturient woman really suffers from labor pains about twenty-five minutes and no more—and these twenty-five minutes are distributed among the four hours of a labor of mean duration.

It has never been pretended that the motive for the anæsthetic practice has any connection with the other pains of women in labor, but only with the suffering from *contraction* or *labor-pains;* for, though we may well suppose that women suffer from painful sensations independent of those arising from the actually contracting womb, yet we find them in general, easy, complacent, and but too happy when *the pain* is off. Hence the ether is exhibited for *the pain*, and for no other motive.

I contend, that it is to an exaggerated notion of the nature of labor-pains we owe the too frequent use of ether in our art; for if the mean of labor-pain be only twenty-five minutes in all, there can be no necessity in the average of cases for its exhibition. I should find the objection to it less and the inducement greater, were the twenty-five minutes of pain to be always twenty-five consecutive minutes. When they are distributed through two hundred and forty minutes, or four hours, I look upon the exhibition as unnecessary and uncalled for.

2d. The representations that have been made by the friends of anæsthesia, of the harrowing distress endured by women in childbirth, do not consist with the general state of facts in the case; and it is quite true that a lying-in room is, for the most of the labor, a scene of cheerfulness and gayety, instead of the shrieks and anguish and despair that have been so forcibly portrayed.

Few women lose their health or their lives in labor, and the dread of future sufferings is insufficient to prevent the increase of the family. As to the necessity of the Letheon practice, the birth of the past myriads of the race shows that it is not necessary.

The propriety of resorting to the use of chloroform and ether as means of obviating the pain and hazards of labor is a question to be settled by an estimate of the safeness as well as necessity of it. It were well, before making up his mind upon this point, were the Student to make himself aware that the encephalon is a compound organ, or a compound bulbous nervous mass, part of which (the hemispheres) are devoted to the offices of intellection; part, the cerebellum, to the duty of co-ordinating or regulating the movement, or the force which is generated perhaps by the whole nervous mass; a part, the tubercula quadrigemina, to the faculty of seeing or vision; and a part, the medulla oblongata, to the important office of governing or giving origin to the act of respiration. Thus we have the brain of intellection, and those of co-ordination of force, of vision, and of respiration. They might be denominated the thinking, co-ordinating, seeing, and breathing bulbs of the nervous mass.

Now, it appears from very numerous reports contained in the *Comptes Rendus* of the French Institute, and from papers in various journals containing accounts of experiments made both in men and in animals, that to breathe for a few minutes the vapor of ether or of chloroform and various volatile liquids, is to cast the subject into an insensibility called anæsthesia, so profound that the cautery, whether actual or potential, the bistoury, the ligation, or the forceps are equally incapable of exciting any sense of pain. Nay, more, that the patient, in some instances, looks upon the incision of his flesh without feeling the knife.

Very soon after ceasing to inhale the vapor, the insensibility disappears, and the individual, upon recovering the use of his faculties, is with difficulty persuaded to admit that he has been subjected to a severe operation; while the mother is incredulous as to her having borne a child during her sleep. Such are the facts. The Student ought to know them. Half an ounce to an ounce of ether poured upon a sponge, and held to the mouth and nose, or a drachm to two or three drachms of chloroform administered in the same way, bring on the insensibility in from three to ten minutes, less or more. The insensibility, once produced, may be maintained according to the pleasure of the physician, by repeating the application of the moistened sponge from time to time upon any manifest signs of returning consciousness.

The statements show that the power of these anæsthetics is capable of abolishing the sensibility, without greatly interfering with the motor power of the subject—or it may abolish the motor power, and allow the sensitive power to be acute, as in health. The inhalation may produce anæsthesia of the thinking brain, yet leave the co-ordinating, breathing, and seeing brains intact—or it may put a temporary end to the power of the cerebellum and tubercula quadrigemina, without influencing the other parts of the encephalon. In short, there is no ascertained law of progression in the activity or power of the anæsthetic agent, chloroform; and no man knows, when he begins to administer the article, upon what part of the brain it will proceed to exert its benumbing power. M. Flourens has shown that all the other parts of the brain may be safely suspended of their forces, provided the medulla oblongata remain unattacked by the agent; and that, as long as the medulla oblongata retains its energy, it is capable of recalling the other bulbs to life and activity through its own force, provided the further inhalation of the letheon be arrested. Hence he calls the medulla oblongata the *vital* tie (*le nœud vital*), since it binds the rest of the encephalon and nervous system with its "silver cord."

Now I have to suggest to the Student the propriety of asking what would be his feelings, provided, in any such case, this silver cord should be loosened; and I ask him whether, if the anæsthesia should proceed, at first, or secondarily, to attack and overthrow the power of the medulla oblongata, his patient would not be instantly deprived of life! For if to breathe is to live, to be deprived of the uses of the medulla oblongata is to die—since on that *nœud vital* depends the whole business of the oxygenation of the body.

Many, and but too many examples of the power of these tremendous agents to overthrow, almost instantly, the force resident in the medulla oblongata, are spread upon the records of medicine in the last few years. I do not well understand how those persons can recover their composure or their complacency, who, by an unnecessary and inappropriate resort to so dangerous a process, have seen the victims of this extraordinary power struck lifeless before their eyes.

It behooves not me to enter into the lists with the surgeons who cast their patients into the deep insensibility of etherization before performing their operations—*suum cuique tribuito* is a proper law for me in this place. But I cannot avoid the feeling of astonishment which seizes upon me when I read the details of cases of midwifery that have been treated during the long profound *Drunkenness* of etherization. To be insensible from whiskey, and gin, and brandy, and wine, and beer, and ether, and chloroform, is to be what in the world is called Dead-drunk. No reasoning—no argumentation is strong enough to point out the ninth part of a hair's difference between them—except that the volatility of one of the agents or its diffusibility as a stimulant narcotic, enables it sooner to produce its intoxicating effect, which is sooner recovered from in one case than in any other of the use of an intoxicating drug.

I showed, in the first part of this section, why I deemed the use of etherization in Midwifery unnecessary; in the second part, I have endeavored to show why it is improper. I have by no means said what I am inclined to say as to the doubtful nature of any processes, that the physician sets up, to contravene the operation of those natural and physiological forces that the Divinity has ordained us to enjoy or to suffer. The question is often propounded as to the Beneficence that ordained woman to the sorrow and pain of them that travail in childbirth. It ought to be taken for granted, without any, the least, disposition to what is called *canting*, that some economical connection exists betwixt the power and the pain of labors. While, therefore, we may assume the privilege to control, check, and diminish the pains of labor whenever they become so great as to be properly deemed pathological, I deny that we have the professional right, in order wholly to prevent or obviate these physiological states, to place the lives of women on the hazard of that *progress* of anæsthesia, whose laws are not, and probably can never be ascertained, so as to be truly foreknown. Notwithstanding I have expressed the above opinions in regard to etherization in Midwifery, which might suffice to expose my sentiments upon that topic, still, my respect for eminent brethren who think differently, calls upon me to acknowledge their equal rights, and probably superior claims to the confidence of the Student. Professor Simpson, of the University of Edinburgh, it is well known, is among the most distinguished and able advocates of anæsthesia in our art. I will not, therefore, refrain from laying before the reader the following letter from that eminent gentleman, with my answer to his communication.

Letter from Professor Simpson.

EDINBURGH, January 23, 1848.

DEAR SIR: By private letters from America, brought by the last steamer, I hear that in most of the cities of the Union, your chemists had failed in preparing proper chloroform; and that, consequently, most experiments tried with it had been unsuccessful. In Great Britain, and on the continent of Europe, chloroform has everywhere entirely, or nearly entirely, superseded the use of sulphuric ether, as an anæsthetic agent. The want of success which has attended its employment in America is, perhaps, owing in a great measure to an error of my own, viz: to my not stating, in my original account of it, the proper method of purifying it. This and other omissions were owing to the haste with which my first paper was drawn up.

I will feel, therefore, deeply obliged by your taking any measures that you may deem fit, to circulate amongst American medical men the formula which I inclose for the preparation of chloroform. It is the formula used by Messrs. Duncan and Flockhart, our Edinburgh druggists, who have already manufactured enormous quantities of it. They always now are able to produce it as heavy as 1500 in specific gravity. Their first distillation of it is made in two large wooden barrels, with a third similar barrel as a receiver. They throw hot steam into the first two barrels, which serves to afford both sufficient heat and water for the process. They employ sixty pounds of chloride of lime at each distillation, and have been able to manufacture three hundred ounces of chloroform a day. Each ounce of the chloride yields, in the long run, about half an ounce of chloroform: consequently, to obtain three hundred ounces (as above), about six hundred ounces of bleaching powder are required. At first, they could only make ten or twenty ounces per diem, then they rose to sixty, and latterly, enlarging their barrels, they can make, as I have said, three hundred ounces in the twenty-four hours.

Various other chemical houses in Edinburgh, Liverpool, Glasgow, York, London, &c., are busy manufacturing it in great quantities. They keep their formulas as secrets. But none of them make so good an article as Duncan and Flockhart, whose formula I append.

The statements which I have already made may show you to what an extent the chloroform is used in this country; and our chemists tell me that the demand for it steadily increases with them.

In *Surgery*, its use is quite general, for operations, painful diagnosis, &c. My friend, Mr. Andrew Wood, has just been telling me of a beautiful application of it. A boy fell from a height, and severely injured his thigh. It was so painful that he shrieked when Dr. Wood tried to handle the limb, and would not allow of a proper examination. Dr. W. immediately chloroformed him—at once ascertained that the femur was fractured—kept him anæsthetic till he sent for his splints—

and did not allow his patient to awake till his limb was all properly set, bandaged, and adjusted.

In *Medicine*, its effects are being extensively tried as an anodyne, an anæsthetic, a diffusible stimulant, &c. Its antispasmodic powers in colic, asthma, &c., are everywhere recognized.

In *Midwifery*, most or all of my brethren in Edinburgh employ it constantly. The ladies themselves insist on not being doomed to suffer, when suffering is so totally unnecessary. In London, Dublin, &c., it every day gains converts to its obstetric employment, and I have no doubt that those who most bitterly oppose it now, will be yet, in ten or twenty years hence, amazed at their own professional cruelty. They allow their medical prejudices to smother and overrule the common dictates of their profession, and of humanity.

No accidents have as yet happened under its use, though several hundred thousand must have already been under the influence of chloroform. Its use here has been a common amusement in drawing-room parties, for the last two or three months.

I never now apply it with anything but a silk handkerchief. In surgical cases and operations, the quantity given is not in general measured. We all judge more by the *effects* than the *quantity*. Generally, I believe, we pour two or three drachms on the handkerchief at once, and more in *a minute*, if no sufficient effect is produced, and we stop when sonorous respiration begins. Not unfrequently spasms, rigidity, &c., come on, but they disappear as the effect increases, and none of us care for them any more than for hysteric symptoms; nor do they leave any bad effect. But the mere *appearance* of them is enough to terrify a beginner.

I shall be glad to hear how the cause of anæsthesia gets on among you, and I remain, with great respect,

Very faithfully yours,
J. Y. SIMPSON.

TO PROFESSOR MEIGS.

The following is the Formula for Chloroform, communicated by Professor Simpson:—

"Take of Chloride of Lime, in powder	4 pounds.
Water . . .	12 "
Rectified Spirits . .	12 fluidounces.
	'*Dumas.*'

"The chloride of lime and water being first well mixed together, the spirit is added. Heat is then applied to the still (which ought not to be more than a third full), but as soon as the upper part of the still becomes warm, the heat is withdrawn, and the action allowed to go on of itself. In a short time the distillation commences, and whenever it begins to go on slowly, the heat is again applied. The fluid which passes over, separates into two layers, the lower of which is Chloroform. This, after having been separated from the weak spirit forming the upper layer, is purified by being mixed with half its measure of strong sulphuric acid, added gradually. The mixture, when cool, is poured into a leaden retort, and distilled from as much carbonate of baryta by weight, as there is of sulphuric acid by measure. The product should be allowed to stand over quicklime for a day or two, and repeatedly shaken, and then re-distilled from the lime."

Reply to Prof. Simpson's Letter.

PHILADELPHIA, *Feb. 18th*, 1848.

DEAR SIR: I have to acknowledge the favor of your letter of Jan. 23d, which I received yesterday.

The chemists in this country have produced very perfect chloroform, of the specific gravity of 1450, as I am informed, and which is much employed in dentistry operations, and to a considerable extent also in surgery.

I presume you will, ere this date, have received copies of Prof. Warren's pamphlet on "Etherization," which may inform you, very fully, as to the use of the anæsthetic agent in the Massachusetts General Hospital, and in Boston. That eminent gentleman is more reserved as to the obstetric employment of the agent; much more so, I understand, than either Dr. Channing or Dr. Homans, and other practitioners, who make use of it very commonly.

In New York, as I learn, the surgical application of chloroform is common, while its obstetrical use has not as yet acquired a general vogue.

In Philadelphia, we have the Pennsylvania Hospital, with more than two hundred beds. A very considerable amount of surgical practice, which renders that house a favorite clinical study for medical students of the United States, has not, as yet, furnished a single example of the exhibition of chloroform or ether as anæsthetic agents. The Surgical Staff of the institution have not become convinced of the propriety of such a recourse in the operations performed there.

In the Jefferson College, to which I am attached, as Professor of Midwifery, etc., there is a Medical and Surgical Clinic held on the Wednesday and Saturday of each week. The resort of surgical cases there is very great, and a Clinical day rarely passes without some surgical operations before the classes. The clinical professors (in surgery), Drs. Mütter and Pancoast, almost invariably employ the chloroform, and the successful exhibition of the article has entirely confirmed them in their opinion of its great value. Some of the operations have been of the gravest character, and no serious event has occurred to check the career of the remedy.

As to its employment in Midwifery here, notwithstanding a few cases have been mentioned and reported, I think it has not yet begun to find favor with accoucheurs.

I have not exhibited it in any case; nor do I, at present, know of any intention in that way, entertained by the leading practitioners of obstetrical medicine and surgery, in this city. I have not yielded to several solicitations as to its exhibition, addressed to me by my patients in labor.

As to the extension of the anæsthesia in the Southern and Western States, I am not at present enabled to give you information. I believe the practice is slowly gaining converts, and that it will become more and more common ere long.

You may perhaps feel surprised at this admission on my part, seeing that I am still a recusant; and I ought, therefore, to be allowed to explain myself, lest I should continue to appear unreasonable in your eyes.

Having carefully read the *Comptes Rendus* of the Royal Academy of Medicine of Paris, which contained full reports of the copious discussions on the question of the Letheon, a few months since, and having also seen the English and American Reports in the Journals, and particularly having read your own pamphlet of "Remarks," &c., I may not properly be accused of ignorance of the power, effects, or motives, in relation to chloroformization in surgery, or obstetricy. The copy of your own pamphlet, for which I now beg leave to thank you, would necessarily have put me *au niveau* on the subject.

Not being myself engaged in the practice of surgery, proper, I prefer to avoid any expression of opinion as to the propriety of the practice; and I do this upon the principle, *suum cuique tribuito.* It would be an impertinence in me, were I to interfere with the conduct of the surgeons.

But, in Midwifery, to which a long and extensive practice has enured me, and rendered me a familiar dispassionate witness of its various forms and phenomena, I am less liable to misconceptions. And here, allow me to say, I have been accustomed to look upon the sensation of pain in labor as a physiological relation of the power, or force; and notwithstanding I have seen so many women in the throes of labor, I have always regarded a labor-pain as a most desirable, salutary, and conservative manifestation of life-force. I have found that women, provided they were sustained by cheering counsel and promises, and carefully freed from the distressing element of terror, could in general be made to endure, without great complaint, those labor-pains which the friends of the anæsthesia desire so earnestly to abolish and nullify for all the fair daughters of Eve.

Perhaps, dear sir, I *am* cruel in taking so dispassionate a view of the case; and it is even possible that I may make one of the number of those "amazed" converts of whom you speak in your worthy letter to me. But, for the present, regarding the pain of a Natural labor as a state not, by *all* possible means, and always, to be eschewed and obviated, I cannot bring myself to the conviction that of the two, whether labor-pain or insensibility, insensibility is to be preferred.

If I could believe that *chloroformal* insensibility is sleep indeed, the most considerable of my objections would vanish. Chloroform is not a soporific; and I see in the anæsthesia it superinduces a state of the nervous system in no wise differing from the anæsthetic results of alcoholic potations, save in the suddenness and transitiveness of its influence.

I freely admit, for I know it, that many thousands of persons are daily subjected to its power. Yet I feel that no law of succession of its action on the several distinct parts of the brain has been, or can be hereafter ascertained, seeing that the succession is contingent. Many grave objections would perhaps vanish, could the law of the succession of influences on the parts of the brain be clearly made out, and its provisions insured. There are, indubitably, certain cases in which the intellectual hemispheres are totally hebetized, and deprived of power by it, while the co-ordinating lobes remain perfectly unaffected. In others, the motor cords of the cerebro-spinal nerves are deprived of power, whilst the sensitive cords enjoy a full activity, and *vice versâ.*

In some instances, the seeing brain enables the patient to look upon the application of a cautery that he does not feel, while it sears him, or of a bistoury whose edge gives him no pain. In others, the influence of the agent upon the sources of the pneumogastric and phrenic nerves is dangerously, or at least alarmingly, made manifest by modifications of the respiratory force. It appears to me, therefore, quite certain, that there is no known law of succession of the ether-influences on the several parts of the brain. It is known that the continued aspiration of the vapor brings at last the medulla oblongata fully under its anæsthetic power, and the consequent cessation of respiration which determines the cessation of the oxygenation of the blood, and thereby of the brain, is death. M. Flourens' experiments, and others, especially those by the younger Mr. Wakley, of the *Lancet*, prove very conclusively that the aspiration of ether or chloroform, continued but a little longer than the period required for hebètizing the hemispheres, the cerebellum, the tubercula quadrigemina, and the cord, overthrows the medulla oblongata, and produces thereby sudden death. I fully believe with M. Flourens, that the medulla oblongata is the *nœud vital*, and that, though later brought under the power of chloroformization, it is always reducible under it. Hence, I fear that, in all cases of chloroformal anæsthesia, there remains but one irrevocable step more to the grave.

I readily hear, before your voice can reach me across the Atlantic, the triumphant reply that an hundred thousand have taken it *without accident!* I am a witness that it is attended with alarming accidents, however rarely. But should I exhibit the remedy for pain to a thousand patients in labor, merely to prevent the physiological pain, and for no other motive—and if I should in consequence destroy only one of them, I should feel disposed to clothe me in sackcloth, and cast ashes on my head for the remainder of my days. What sufficient motive have I to risk the life or the death of one in a thousand, in a questionable attempt to abrogate one of the general health conditions of man?

As to the uses of chloroform in the medical or therapeutical treatment of pain, the question changes. There is no reasonable therapeia of health. Hygienical processes are good and valid. The sick need a physician, not that they are well. To be in natural labor, is the culminating point of the female somatic forces. There is, in natural labor, no element of disease—and, therefore, the good old writers have said nothing truer nor wiser than their old saying, that "*a meddlesome midwifery is bad.*" Is chloroformization meddlesome?

Your countryman, old Thomas Rainald, in the "Woman's Booke, or The Byrthe of Mankynde," at fol. liii., says, "Very many be the perilles, daungers, and thronges, which chaunce to women in theyr labour." These are the cases requiring our therapeutical and chirurgical intervention. You will, my dear sir, think me a hopeless recusant, if I decline the anæsthesia here also. I pray you, therefore, allow me to state my reasons for such recusancy.

If I were amputating a limb, or extirpating a tumor, I should see all the steps of my incisions, ligations, &c. But if I apply my forceps in a right occipito-posterior position (fourth of Baudelocque), I know that I thrust the blade of the male branch far upwards betwixt the [illegible] of the child and the upper third of the vagina, which, in this case, [illegible] already greatly expanded, and that the extremity of the blade is separated from the peritoneum only by the mucous and condensed cellular coat of the tube. Now, no man can *absolutely* know the precise degree of inclination his patient will give to the plane of her superior strait, while in pain; an inclination to be modified by every movement of her body and limbs. Under such absolute uncertainty, the best guide of the accoucheur is the reply of the patient to his interrogatory, "Does it hurt you?" The patient's reply, "Yes," or "No," is worth a thousand dogmas and precepts, as to planes and axes, and curves of Carus. I cannot, therefore, deem myself justified in casting away my safest and most trustworthy diagnosis, for the questionable equivalent of ten minutes' exemption from a pain, which, even in this case, is a physiological pain.

Having thus, in my own defence, and not as attacking your opinion, set forth the motives that have hitherto served to restrain me from the administration of chloroform, I desist from giving you any farther trouble in this line of thought. I have, Sir, a far more pleasing duty to perform, in saying that your name is as well known, perhaps, in America as in your native land, and to congratulate you on the extension of your fame. I had the pleasure to read your interesting letter to my class, consisting of several hundred young gentlemen, who listened to your words with the same respect they would have paid to you, had they been pronounced by your own lips. They will disperse themselves in a few days hence, over all the States of the Union, and thus will have it in their power to report the latest dates of your opinions as to chloroform. I shall also allow it to be published on the first proximo, in a medical journal of extensive circulation. You will herein perceive the readiness with which I assist in disseminating your views. It is not without regret that I find myself opposed to your opinions in the case. That difference ought not, however, in the least degree, to affect those sentiments of respectful consideration and real esteem with which I am, dear sir, very faithfully, your obedient servant,

CH. D. MEIGS.

PROFESSOR SIMPSON, &c.

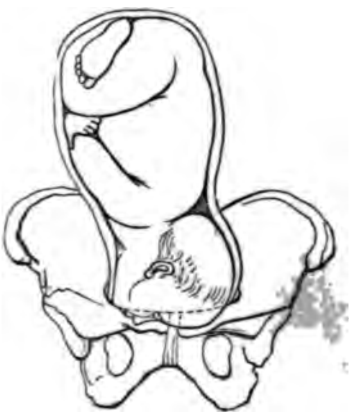
Having reprinted the foregoing in this new edition, in order that the reader might see what I said and thought, in a Journal, in 1848, I have now to state that I adhere, in 1852, to these opinions, and consider them sound and just, and recommend them with a clear conscience to my readers.

CHAPTER XI.

FACE PRESENTATIONS.

In cases in which the usual dip of the occipito-frontal diameter fails to take place, but, on the contrary, is reversed, so as to allow the chin to depart far from the breast, the head may be actually turned over backwards, permitting the child's face to fall down into the pelvis.

Fig. 78.



In face presentations, as delineated in Fig. 78, annexed, the chin is on one side, and the *top* of the forehead upon the other side of the pelvis. The face seems to be looking directly downwards into the excavation of the lower basin. This could not be the case without complete departure of the chin from the breast (*see the figure*), and an absolute overset of the head backwards, as in a person who should be looking upwards at an object directly overhead.

These are what are denominated **Face Presentations**: a sort of labors that are now thought to be less unnatural and dangerous, than in former times. I am clearly of opinion that face cases may well be included among the natural labors, except where some failure in the powers of the woman should cause us to convert them into preternatural ones, feeling obliged to turn and deliver by the feet; to restore the vertex by some serious operation; or to extract with the forceps, or other instrument.

The fœtal head being an oval, five inches long, from the vertex to the chin, and more than three and a half inches wide at the widest part, it ought to make no difference, as far as the mere head is concerned, whether the chin or the vertex advances first in labor, because, Since the date of my letter to Prof. Simpson, I have been induced by many motives to administer ether (never have I given, nor will I ever give any person chloroform), in a considerable number of cases: many of the women were delighted with its operation after they had recovered from the intoxication, but about an equal number appeared to have been disgusted with, or indifferent to its effects. I have certainly observed, in most of the experiments, that it lessened the frequency and power of the pains; and, in some of them, I was obliged to lay it aside wholly, until the motor powers of the womb, recovering from the stupefying influence of the intoxication or dead-drunkenness of the woman, allowed the labor to proceed, or to be terminated by a forceps operation. I have lost two children in labor because of the anæsthesia, as I fully believe; and some of my patients have had affections and post-partum symptoms, the remembrance of which makes me well content to remain among the opponents of the practice.

I say these things, not with any feeling of disrespect, nor with a desire to disparage those of my medical brethren who habitually employ the anæsthetics in Midwifery, but in order that I may speak the truth as it appears to me, and let that truth pass for as much as it is worth, and no more. I shall only add that I sincerely regret the introduction of anæsthetics into Midwifery; not because they are not useful and laudable in some rare cases, but from a conviction that the use of them has become a great abuse, which I believe will become greater until the day—no distant one—shall arrive, when mankind, and the profession also, shall have been convinced that the doctors have made a mistake on this point, in this part of the nineteenth century.

In Sept. 1856, I remain unconvinced of the propriety of using ether in all labor cases, indiscriminately. Since 1852, I have allowed several of my patients to take ether, on account of pain that seemed excessive. All my experience leads me to hold to the opinions expressed in my letter to Dr. Simpson. I am still quite convinced that the discovery of anæsthesia in midwifery, has done more harm than good, and I believe its use will decline, and not increase. I think it is declining already.

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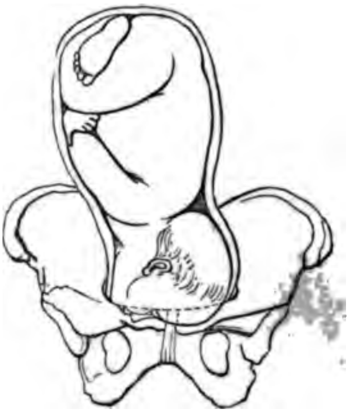


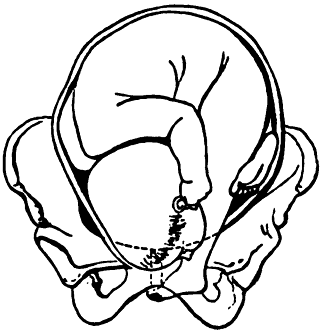
These are what are denominated Face Presentations: a sort of labors that are now thought to be less unnatural and dangerous, than in former times. I am clearly of opinion that face cases may well be included among the natural labors, except where some failure in the powers of the woman should cause us to convert them into preternatural ones, feeling obliged to turn and deliver by the feet; to restore the vertex by some serious operation; or to extract with the forceps, or other instrument.

The fœtal head being an oval, five inches long, from the vertex to the chin, and more than three and a half inches wide at the widest part, it ought to make no difference, as far as the mere head is concerned, whether the chin or the vertex advances first in labor, because, in either case, the same circumferences of the head are presented to the planes through which they are to be transmitted. The foramen magnum of the occipital bone being nearly equidistant from the vertex and chin, and situated on one side of the oval, the peculiar difficulties and hazards of these labors are attributable, rather to the nature of the articulation by which the neck and head are conjoined, than to the form of the head itself, when advancing with the face downwards. The nature of this articulation is such, that extension of the head cannot take place so well as flexion; hence the requisite dip of the occipito-frontal diameter is not effected in face cases without difficulty, and the consumption of much time.

Let the reader figure to himself the state of the spinal column of a child, urged on in labor by powerful uterine contractions, directed to its expulsion with the face in advance. The inferior-posterior part of the head is pressed against the back of its neck, or betwixt its scapulæ, which could not be the case without bending the cervical spine backwards, like a bow, while the dorsal and lumbar vertebræ are curved in the opposite direction, causing thus a double antero-posterior curve, on which, in consequence of the elasticity of the two arches, much of the expulsive force is vainly expended; so that, though the power may be as great as in a common labor, it produces much less effect than in a common labor—a great part of every pain being expended in reproducing the greatest amount of curvature; for the elasticity of the two curves is such that they are straightened, at least, in some measure, as soon as the pain subsides, while the rest of the pain is used in pushing the face onwards.

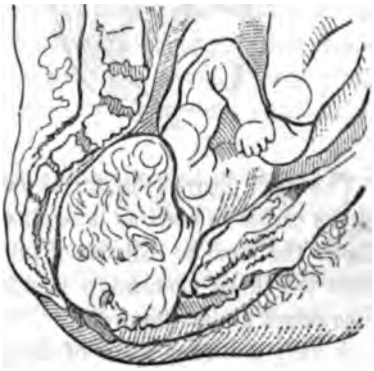
A child in utero ought to be in a state of universal flexion, as I have already remarked. It cannot be in extension, as supposed by the old authors, whose rude cuts, accompanying their crude descriptions of labors, are calculated to excite a smile of pity in any modern obstetrician. In this state of flexion, the chin approaches or even touches the breast. Such a flexion in a head labor always gives us a vertex position. But if the chin, instead of approaching, depart from the breast, there is a tendency towards the face presentation. Let the Student consider that when the chin departs from the breast, it does so by slow degrees, and not suddenly, nor wholly, at once. Hence he should in face presentations, whose whole progress he has opportunity to supervise, expect to touch at first the top of the forehead as the lowest point, or presenting point. As the labor goes on, the head continues to turn over more and more completely until it is at last quite overset backwards; as may be seen in the annexed drawing (Fig. 79), in which, in addition to a face presentation, there is a prolapsion of the left foot. If, in such a labor as this, the foot were thrust back into the womb during the absence of a pain, we should have a very bad case of face labor, with the chin to the sacrum, and the forehead to the pubis.

Fig. 79.



When the face presents, the head does not enter the excavation with the fronto-mental diameter parallel to the plane of the strait. On the contrary, the frontal extremity of that line is lowest at first, but the mental extremity of it comes at length to be lowest, at least as regards the successive planes through which it passes in the lower part of the pelvis, as may be seen on reference to the neat figure which is annexed.

Fig. 80.



The direction taken by the face, as it proceeds, in such a labor, is worthy of the closest attention of the practitioner. Should the chin enter the superior strait near to the acetabulum, it will afterwards rotate toward the arch of the pubis, and, escaping under that arch, will rise upwards over the pudendum, so as to allow the under aspect of the chin and the throat to be applied to the arch, and to the front of the symphysis, while the remainder of the head is evolving itself from the os externum. In such a birth, the part that first emerges is the chin; then the mouth, the nose, the forehead, the crown; and, last of all, the vertex, which escapes over the fourchette, whereupon the flexion of the head immediately becomes complete again.

This is the most favorable direction for the face to take, and it will generally be found that a well-formed pelvis is capable of transmitting a child of moderate size almost as speedily and safely, in such a labor, as if it were a vertex presentation. Let it be remembered that the symphysis of the pubis is only one inch and a half long, and, of course, if the chin should escape under the arch, the neck is so long that the throat can apply itself against the inside of the symphysis, allowing the chin, nay, the whole head to be born, before any part of the thorax of the infant begins to plunge into the excavation.

Figure 81 may serve to show how the chin, in a favorable case, comes, at last, to the symphysis pubis, slides down behind it, and at length begins to emerge underneath the crown of the pubal arch. Look at the figure; reflect that the occipito-mental diameter is five inches, and the pelvis only four and a half; and that, as soon as the chin begins to come forward under the arch, the five inch mento-occipital diameter is coming, with its mental extremity, out beneath the arch.

Fig. 81.

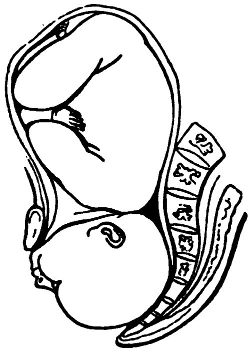
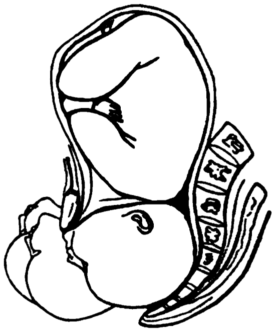


Fig. 82.



The next figure (Fig. 82) shows how the chin rises upwards in front of the pubis as soon as it begins to escape beyond the arch, and thus allows the head to roll out of the excavation. The three outline heads show the three successive positions of the cranium after the chin has once come under the arch.

A very contrary state of things from the foregoing obtains where the chin, instead of revolving towards the front, turns towards the back part of the pelvis. Here the forehead must appear first; then the nose; next the mouth; and lastly, the chin, escaping from the edge of the perineum, retreats towards the point of the coccyx, allowing the crown of the head to pass out under the arch; and finally, the vertex emerges, which concludes the delivery of the head. I say that the forehead appears first, not that it is born first, for the part first born is the chin. When the chin has escaped, and begun to retreat behind the perineum, the mouth becomes delivered, then the nose and eyes, top of the forehead, crown, and, lastly, the vertex. This must be the case, considering that the occipito-mental diameter is fully five inches long, and that there is no antero-posterior, oblique, or transverse line of such length in any part of the lower excavation. It is impossible then to see-saw a diameter of more than five inches within the excavation. Therefore, if the mental extremity of the occipito-mental diameter descends first, it must escape first, and the occipital extremity last. But, while the chin is sweeping, slowly and painfully, down the curve of the sacrum, and especially, when it is got so low as the edge of the perineum, the breast of the child is also entering the pelvis, where the space it should occupy is already taken up by the perpendicular diameter of the head. Imagine the painful distension of the parts within the pelvis, and the enormous extension of the os externum, required for the exit of the child, in such a case!

Fig. 83.

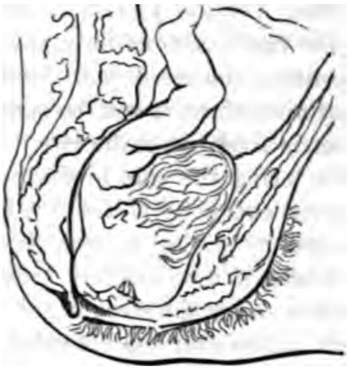


Figure 83 shows the difficulty that is produced by a rotation of the chin backwards, in so clear a light, that I hope it may greatly assist in teaching the young Student how extremely important a matter it is to give all possible aid and assistance to nature, in her attempts to turn it towards the front of the pelvis.

The cause of face presentations is not perfectly well understood; it is, however, probable that they are more commonly occasioned by an obliquity of the womb than by any other cause. For example, let the womb, at the onset of labor, be so oblique as to throw its fundus far down to the left side, the child presenting by the head, and the vertex to the right side of the pelvis: the direction of the expulsive force operating on the infant will propel its head against the edge or brim of the pelvis, and either cause the head to glance upwards into the iliac fossa, so as to let a shoulder fall into the opening, or it will be turned over, so as to let the face fall into the opening, and thus produce a face presentation, in which the chin is near to the left acetabulum, and the forehead to the right sacro-iliac junction. It is easy to set this in a clear light, especially if it be accompanied with demonstrations on the *phantome*.

In my opinion, it would be right to admit, in a systematic arrangement, only two original positions of face-presentations: viz., one with the chin to the right, and one with it to the left in the pelvis; it being always understood, that the position is not necessarily exactly transverse, but that the chin may be variously addressed, sometimes, and indeed most generally being so far back as to be near the sacro-iliac symphysis, and sometimes more anteriorly, or near the body of the pubis; Velpeau prefers to have only two positions. By admitting these two positions only, the Student's mind is relieved from the burden of unnecessary artificial distinctions; and should he in practice rest upon them, it will be easier for him to comprehend the practical doctrines relative to the case. Thus, in all face cases, the great doctrine is to bring the chin to the pubic arch, because the chin, being the mental extremity of the five inch long mento-occipital diameter, may escape by gliding an inch downwards behind the symphysis pubis; whereas, if it be directed backwards to the sacrum, it must slide five inches down the sacrum and coccyx, and from three to three and a half inches over the extended perineum, before it can be born; but, five inches and three inches make eight inches. The child's neck is not eight inches long. Therefore, before the chin can slide down the sacrum, and off the anterior edge of the extended perineum, a good part of the child's thorax must be pressed or jammed into the excavation along with the head, the vertical diameter of which alone is more than three and a half inches. (*See* Figure 83.) If we should adopt four positions, we must have a doctrine for each; but with the two only, there is a necessity for only one doctrine—namely, to bring the chin to the arch of the pubis, if practicable; if not, let the forehead come, and do our best with it.

Face presentations are accidents; and, perhaps, they are so unlikely to happen, in consequence of the normal law of fœtal flexion, that they ought to be regarded as examples of preternatural labor. Yet, when we come to reflect that the female can generally expel the child with but little more difficulty, in this case, than in vertex positions, it seems altogether proper to regard them as natural cases. But I have said that they are accidents, and I believe that they are accidents caused by deviations of the axis of the womb. I beg leave to repeat that, if a female have a very great right lateral obliquity of the womb, and the vertex present towards the left side of the pelvis, it may be impelled against the brim in such a manner as to glance above it, and allow the forehead to fall into the opening, which state could not exist long without being followed either by the descent of the face, or the inducing of a shoulder presentation. It should never be forgotten that, from the chin to the vertex is a distance of five inches, which none of the diameters of the straits will take in, in the living subject: therefore, if the vertex should rise above the brim, and let the forehead fall into the opening, the chin would gradually come down.

Let not the Student then expect to find the face looking full down into the excavation, at the beginning of these cases; but rather, let him expect to find it coming more and more completely down as the labor draws to its close; hence, all face cases are at first cases of forehead presentation, and, whenever the chin departs from the breast in a labor, let him take heed lest it lead to a face presentation.

I propose to the American Student to adopt Dewees's recommendation, to have only two face presentations, and to let the first be that in which the forehead is to the left, and the chin to the right side of the pelvis—while the second position is that in which the forehead is to the right, and the chin to the left side of the pelvis. Let this be the decision; and let the Student, though he finds the chin disposed to address itself to a point in rear of the transverse diameter, still consider it as a first position, or a second position, as the case may be.

Suppose a case of face presentation to be caused by a right lateral obliquity of the womb, the point of the head being repelled above the edge of the strait: the womb, in its oblique state, leans to the right and *forwards*, and not directly towards the right; whence, if the accident occur in the manner supposed, the chin could not fail to be placed to the right, and a little forwards; the same thing is true of cases caused by left lateral obliquity—*mutatis mutandis*—as before stated. This furnishes a striking manifestation of the wisdom which, in giving form to the pelvis, even provided us herein a remedy for the accidents that might occur to thwart or prevent the parturient act. Should the chin be towards the posterior part of the pelvis, and not susceptible of being directed towards the front of the pubis, the most serious mischiefs might be expected to occur; whereas, when the chin advances toward the pubis, little embarrassment is, in general, to be apprehended.

If we could know, antecedently to the descent of the presenting parts, what they are, it might be supposed that we could easily restore them when wrongly placed, to their proper situation; but, while the presenting part of the child is above the brim, it is very rare, if not indeed impossible, to have such a good degree of dilatation as to admit of the hand being introduced, in order to effect the needful changes. The womb opens as the part comes down, and only as it does come down. Hence, when a face case is ascertained to exist, it is mostly (I say not universally) too late to return it into the abdomen or superior basin; and as to attempting to bring down the vertex, after the head has once sunk well into the excavation, I regard it as a rash, if not an impossible operation; rash, since it could not be done without very great violence; and generally impossible, since we cannot turn or see-saw a diameter of full five inches in a pelvis furnishing less than that space. Where it is possible to push the whole mass back, and bring down the vertex, let it be done, if deemed really necessary; but the opportunity to do this good action will rarely occur in practice. Viardel tells us that, in Sept. 1669, he was called to Madame Nissole, who had been already two days in labor with a face presentation. He made use of a compress, with which, thrusting upwards with the fingers, he pushed the face, *i. e.* the head, back again; and so enabled him, after he had raised it up, to slide his hand along the face until he got hold of the vertex, which he pulled downwards, and thus restored the chin to the breast, placing the head in *extension.* Viardel boasts of this case—but it is doubtful whether he could have pushed the head back if it were already out of the womb at the time of his arrival. And if it were not yet in the vagina, he did an imprudent act of meddlesome midwifery in his operation. He relates the case at p. 110 of his *Obs. sur la Prat. des Acc.*

Dead, and half putrid children, in whose tissues there is scarcely any resiliency or resisting power left, are not so unapt to come face foremost as living children, in whom departure of the chin from the breast occasions such a great extension of the head as to be painful, whence the living child instinctively opposes the wrong tendency, by acting with all its strength, to get the chin back, or the head flexed again.

Let me repeat that it is not to be expected that, at the very beginning of a labor, the face of the child shall be found looking directly downwards. When the examination is made early in a labor, the os uteri being dilated very little, the accoucheur ordinarily rests content with ascertaining that the head presents, and does not endeavor to complete the diagnosis as to position. Hence, there is almost always an early mistake in the diagnosis and prognosis, for it is the forehead that is first felt; and the face itself does not appear in the excavation for some time after the commencement of the parturient throes. The head turns over only by degrees, and allows first one eye to be felt, and then the other, the nose, the mouth, and the chin. In order to exemplify these processes, I shall cite some cases from my record-book.

On the 5th day of February, 1830, I was called to attend Mrs. ——, in labor with her second child. When I reached her house, it was half past six o'clock in the morning. She told me that she had had pain for a day or two, but was seized with regular labor-pains at four o'clock this morning. Upon making examination per vaginam, I found the os uteri from one inch and a half to two inches in diameter, with the edges thin and ductile, and the very tense membranes protruding through them during the pains. I could, at first, just feel the even smooth surface of the fœtal cranium, which seemed to be resting or lodged upon the top of the symphysis pubis, and not in the least degree *engaged*, or entered into the superior strait; this was all that I learned from this first examination, and was all that I wished to learn.

As the pains were regular and good, I expected soon to find the head engaged within the passage; but I observed that the uterus was very large, as if distended with an undue amount or excess of liquor amnii.

At nine o'clock A. M., the pains, although regular and of increasing severity, had not caused the head to engage in the slightest degree; it remained exactly as at the first Touching. These circumstances led me to suspect that the womb was unprovided with a proper degree of energy, on account of its being distended beyond its just dimensions. I deemed it, on this hypothesis, advisable to rupture the ovum, in the expectation that, as soon as the womb should condense itself a little by the flowing off of the waters, it would acquire such vigor as to compel the head to engage in the strait, and thence pass speedily into the excavation, as I had repeatedly observed to be the case in other persons.

Upon rupturing the ovum, there came off a very great quantity of water; I should think nearly two quarts in all; but the head did not advance until three or four pains had acted upon it; after which it came slowly down, and I felt a suture; but as yet no fontanel was distinguishable. The examination induced me to suppose it was a vertex presentation of the first position, in which opinion I was most egregiously deceived, in consequence of the very careless manner in which I made the investigation. At eleven o'clock, I made a more careful inquiry, and was distressed to find that the left side of the os frontis was in the middle of the excavation, and that, by passing the finger very strongly up towards the left sacro-iliac junction, I could feel the edge of the left orbit and root of the nose, beyond which it was impossible for me to reach, in the then state of the organs of generation.

It seemed, on account of the advanced state of the labor, too late to turn, even if that could have been considered the best resource; and I was the more averse to such a proceeding, considering that I had before delivered her of a large child, and also that the waters were now drained off, and the uterine contractions powerful.

As she had by this time become heated, and very much disquieted with her pains, from which the suffering was severe, I gave her thirty drops of laudanum, and soon afterwards took twelve ounces of blood from the arm. She also got an enema of flaxseed tea and olive oil.

The head was now fairly engaged, and the face was becoming more and more the presenting part, notwithstanding my repeated endeavors to push it up, by forcibly pressing against the ossa malarum during each pain; and I became thoroughly convinced that it was impossible to force up the face and bring down the vertex by the employment of any legitimate force, or by mere dexterity.

The pains had become so dreadfully severe, and the poor woman suffered such agonies, that I really entertained serious apprehensions that the womb might rupture itself or the vagina, in its vain efforts to carry on the parturient processes, lashed as it was into a rage of excitement by the obstacles to delivery.

At my request, Dr. James, at that time Professor of Midwifery in the University of Pennsylvania, was invited to see the patient, and arrived at two o'clock in the afternoon; and after having examined the case, left me with encouragement to hope that the vertex might come down after some further efforts of the womb. Dr. J. was to return to me at half past four o'clock.

In the mean time, I provided myself with the long right hand blade of Davis's oblique forceps; and when the professor returned, at four o'clock, it was found to be vain any longer to expect the descent of the vertex. I therefore introduced the blade above mentioned behind the right ramus of the pubis, got it upon the left parietal bone, and, using it as a vectis, drew down with it during the pains. The head advanced very much by this aid, and began to press upon the perineum; but there it stopped, and seemed no longer affected by the vectis.

I next attempted, with my Baudelocque forceps, to introduce the male blade behind the left obturator foramen. I was foiled, but Dr. James succeeded in adjusting it. Every attempt to adjust the female blade, whether made by Dr. James or by me, proved fruitless. They could not be made to lock; nevertheless, I rashly attempted to deliver with them by securing the joint with one hand, and by this means the head again advanced, but soon stopped. The forceps were now abandoned, after vainly attempting to make them lock. I next resorted to the oblique vectis again, and with it caused the head to advance so much, as to put the perineum in a state of tension. The chin turned to the pubic arch, and then emerged from the genital fissure; and as the successive portions of the face came forth, the chin rose up to the mons veneris, and allowed the fourchette to slip backwards off the vertex, which immediately retired towards the coccyx.

The child was born, but the cord, which was tight around its neck did not pulsate; the infant, however, began at length to gasp, and after having been well dashed with brandy, cried lustily. It was born at half past six o'clock P. M., so that the labor was found to have continued about fourteen or fifteen hours.

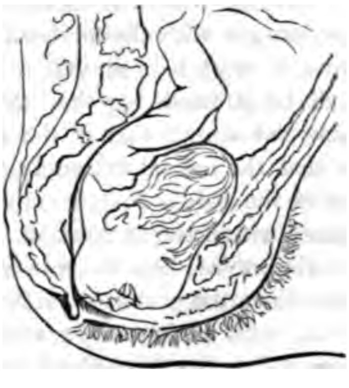
At the time I last put on the vectis, the child's chin was in the left sacro-iliac corner of the pelvis. Both Dr. James and I expected that the rotation would inevitably carry the chin to the sacrum, to be consequently delivered at the perineum. I have every reason, therefore, to suppose that the vectis was the chief means of giving the head so favorable a rotation, a result attributable to the admirable curve of Dr. Davis's oblique blade.

The perineum was not hurt; the placenta came off in twenty minutes, and the mother found herself very comfortable, considering her great fatigue.

The face was one enormous suggillation, carried to the extent of producing numerous blebs or vesications on the eyelids and cheeks. The mouth was excessively swelled, and the left eye completely closed. The face was, on account of this state, directed to be frequently bathed with cream. This infant was carefully weighed on the evening of its birth, and was found to weigh nine pounds and three-quarters. On the sixteenth day after delivery, the woman was down stairs to dinner, and had no subsequent indisposition.

In giving the details of this case, I am liable, as I well know, to the charge of having, in an important matter, anticipated my subject: but although I have not yet come to the formal consideration of instrumental cases, I feel pretty well assured no evil will happen to any Student for having, by reading the foregoing relation, in some degree anticipated the regular and formal consideration of obstetric operations.

Fig. 84.



The cut Fig. 84, which represents the fœtal head, in a face labor, thrown back to that degree as to press the occipital bone against the interscapular space, suffices to show how well founded were my fears lest the forehead, instead of the chin, should rotate to the front, to prevent which is the chief doctrine of this obstetric topic; and I would again urge the Student to take the first opportunity that may present itself, of testing the doctrine, by trying to deliver on the machine, or *phantome*, with the chin backwards, in a face presentation. By so doing, he will at once have a demonstration of the point of practice to be adopted, and never afterwards be in the least danger of making a mistake, or committing a blunder in this matter.

Seeing the great and merited reputation of the late Professor Dewees, of Philadelphia, and the general recourse to, and reliance on his obstetric precepts, I feel constrained to warn the Student of one error in his *System of Midwifery*, 2d edition, 1828. He is speaking, at p. 328, of the instrumental delivery in a face-labor.

"Should the forceps be determined on, we must apply them over the ears; that is, one blade behind the pubis, and the other before the sacrum; they must be so applied that the concave edges must look towards the hind head, which must be brought under the arch of the pubis and not the chin, as directed by Smellie."

This operation would inevitably, if successful, bring the top of the forehead and the crown of the head under the arch, and the chin to the sacrum and the coccyx, as in Fig. 84. To deliver it, would imply that the child's throat should stretch to a length beyond eight inches, or that the thorax and head should both be in the excavation together. I should not have noticed this lapsus of my celebrated townsman, but as evidence of my respect for his great reputation, and because I know that it was a *lapsus pennæ*, and not a precept that he would follow in practice. When such authorities happen to fall into even a small error, it is proper to point out the error, lest an accidental error with the authority of a great name should mislead the early beginner, or Student.

I should think no long disquisition would be required to convince the Student who will carefully examine the Fig. 84, that, in a face presentation with the forehead to the pubis, and the chin to the sacrum, it must happen that a considerable part of the child's thorax shall be jammed, together with the cranium, into the pelvis. The same cut shows that if the occipito-mental diameter be reversed, so that the mental extremity of it, instead of the occipital extremity, enters the pelvis first, it must leave it first, for it cannot be reversed within the excavation. Further, let the Student examine the drawing, to see how the chin must in these unfortunate presentations slide down the posterior surface of the pelvis, from the promontorium to the point of the coccyx, and so over the perineum, until it escapes from the vulva, over the fourchette. In examining Fig. 80, he will readily perceive how easy it is in that case for the mental extremity of the oblique diameter to begin to escape, since it has only a slide of one inch along the symphysis pubis to make before it emerges; whereas, in the reverse position, it slides seven or even eight inches, over bone and resisting tissue, before it can begin to be born.

A case of a different kind occurred to me on Wednesday, the 17th of February, 1830. Mrs. M. was in labor with her seventh child, having been taken at four o'clock A. M. with the pains, which continued to increase up to the time when I arrived, which was about half past six o'clock. The pains were strong; the waters gone off; and the head pretty low down in the pelvis. At my first examination, I mistook the presentation, thinking that it was a vertex case; but, as the pains seemed to have no good effect, I examined again, and could feel the root of the nose *directly* behind the symphysis pubis, and the superciliary edges of the orbits upon each side of the symphysis of the bone.

Upon this discovery, I endeavored to turn the forehead towards the left, by raising the os frontis, and pushing it in the proper direction; but as soon as each pain came on, it forced the presenting part back again into its former position. I next endeavored, by simply pushing up the forehead during the absence of a pain, and sustaining it while the pain was active, to cause the vertex to descend along the curve of the sacrum, and on to the perineum: but I could not succeed here any better than in my attempts at rotation: the pains drove it back, maugre all my wishes to the contrary. As the chin was so far departed from the breast, I had good reason to fear that the head must turn quite over in extension, and thus give me a face case to manage; for, as I could feel the superciliary ridges on each side of the symphysis pubis, there was some likelihood of a complete overset of the head, provided the cranium was not too large.

The patient, who had met with no such difficulties in her former labors, and to whom I was a stranger, now became greatly alarmed and distressed; so much so, indeed, that I judged it most prudent to explain to her the true situation of affairs, and encourage her to look for relief after a reasonable time. I told her that she could be delivered by her own unassisted efforts, but that it would take a good deal of time and much pain; but that I could speedily deliver her with the help of an instrument, which would add neither to the hazard or pain of her condition. She clapped her hands, trembled violently, and uttered exclamations indicative of the greatest dismay, and even terror, but at last agreed to be guided by my opinion.

I introduced the right-hand long blade of Davis's oblique forceps, with which I caused the head to make a considerable advance; but it again stopped, and I applied the Baudelocque forceps; with the aid derived from this instrument, I drew the head downwards so as greatly to extend the perineum;, upon observing which, I deemed it prudent to remove the forceps, lest I might rupture the perineum, which was about to undergo, unavoidably, a very great distension, and which I was not inclined to augment too rapidly. After removing the forceps, I reapplied the vectis, as before, and it very greatly assisted me to bring the head onwards as far as was requisite. As soon as I withdrew the vectis, a pain came on, by which the head was expelled, the vertex passing out over the fourchette, upon which it immediately completed its act of extension, and allowed the crown, forehead, nose, and chin successively to escape under the pubic arch. The child was born alive, and the after-birth followed in ten minutes. Upon the infant's forehead was an enormous black suggillation, which disappeared in the course of a few days, and was followed by no inconvenience.

Of the above case it is proper to remark that the mother was very well formed, and the pelvis large; the child of medium size; and although it did not become actually a face presentation, but was rather a case of presentation of the forehead, it still serves to illustrate my observations on the difficulty of converting face presentations into those of the vertex. I think that, but for the aid of the instruments, it must have at last brought the face from behind the top of the symphysis pubis to look fully down into the excavation; for the difficulty of bringing down the vertex, although not insuperable, was exceedingly great. Perhaps the labor would have been easier, had I turned the head quite over! In some small heads, I have pulled the chin down, and let the vertex rise; but this can be well done only where they are small. In the course of my practice, I have met with a considerable number of cases like the one whose relation I have just given, but it seems unnecessary to cite them here, as I presume this one may suffice to explain the nature of the mechanism of such a labor.

I find, in my case-book, another example of face presentation, which I shall not deny myself the privilege of laying before my reader in this place, because it offers good encouragement to those who may happen to meet with such untoward sorts of labor in the commencement of their practice.

October 11, 1830. Mrs. C. W., aged twenty-six, was in labor with her first child. I was called at twelve o'clock at night. She had been poorly throughout the day, but kept about until bedtime. At ten P. M., had a violent pain, and large discharge of waters. She lay on her left side. Upon Touching, I could not reach the os uteri, nor feel any part of the child. Upon causing her to turn on the back, I was enabled, by pushing the finger very far upwards and backwards, to hook the anterior lip of the os uteri, and draw it, by means of the finger, downwards and forwards, into the centre of the plane of the upper strait: I could then touch the child's cranium, but I could not touch a sufficient portion of it to learn what part of the cranium it was. Not long afterwards I felt, in the left anterior part of the upper strait, a ridge or edge, which I soon made out to be the superciliary edge of the orbit of the left eye, the globe of which soon came within my reach. I could not touch the anterior fontanel.

Here, then, was a case which, like that just now related, was to become a face presentation at last, if I should prove unable to prevent it by failing to restore to the head its lost flexion. I vainly tried to do this by pushing up the forehead, and holding it up during a pain. It always came back to its place, in spite of whatever efforts I could make. I next introduced the whole hand, except the thumb, took hold of the vertex by a fair purchase, but could not turn it downwards; and at length, becoming convinced of the impossibility of succeeding, resolved to abandon such irritating interference.

As the head sank lower and lower, there was an obvious tendency of the chin towards the left sacro-iliac junction. I opposed this movement of the head by pressing the finger on the left side of the nose, which kept it from turning to the left, and at last brought it to the obturator foramen. The face came more and more down into the excavation, and began to swell very much. The lips became excessively tumid, and the whole face at last felt like a tense bladder. By the force of the pains alone, the chin was afterwards slowly brought to the os externum, and applied itself to the top of the pubic arch, under which little by little it emerged, and then rose up towards the mons, permitting the front of the throat to take its place under the arch, and thus allowing the vertex to escape last from before the fourchette. (*See* Fig. 82, p. 380.)

The placenta came off in six minutes. The infant was very weak, and its face greatly swollen, and black with the suggillation. It soon cried loudly, and I found that on the 14th, that is three days after its birth, it was in fine health, and without any swelling of the face. The mother had a very favorable getting up. The net weight of the infant was nine and a half pounds. The mother was a large and very powerful woman.

Madame Boivin informs us, in her *Mémoires sur l'Art des Accouchemens*, page 276, that, out of seventy-four cases of face presentations, fifty-eight children were born naturally. Of these, forty-one were delivered without any assistance, and seventeen, by restoring the vertex to the centre of the excavation; a success almost incredible. Fourteen cases required the turning and delivery by the feet, while only two were extracted by the forceps, and in one of the latter cases the mother had convulsions.

"Thus," says the learned lady, "although presenting by the face, the child may be born alive and naturally, provided the head be not too large, if the parts of the mother are well formed, the pains strong and good, the woman resolute and healthy, and no accident occur during the course of the labor."

Madame Lachapelle, whose vast experience, gained while at the head of the Maternité Hospital at Paris, gives her valid claim to speak as with authority, and whose thorough knowledge of the theory of midwifery must confirm those claims as rights, gives us only two sorts of face presentations: one in which the forehead is to the left, and the chin to the right, of the pelvis, and the other in which the forehead is to the right, and the chin to the left. She says she never met with Baudelocque's first and second positions. Dr. Dewees, who asserts that his list comprises near nine thousand labors, also informs us that he never met with them. It will be remembered by the reader, that the second case which I related in this chapter, that of Mrs. M., was one in which I felt the root of the nose behind and above the symphysis, and the two orbits on each side of it; and he will admit that, although the vertex was at last restored so as to escape first, yet this was a real example of a face case of the rarest occurrence. Smellie gives us at least four examples of the face presenting in Baudelocque's first or second position; and assuredly no English or American student of Midwifery will be disposed to call in question the accuracy or candor of that admirable author, notwithstanding that Madame Lachapelle tells us she finds no very evident examples of such face positions in any good collection of cases.

For my own part, I do not perceive the great importance of dwelling with much emphasis upon all the possible positions of the face. It cannot be doubted that they are each possible, inasmuch as, where the child's head is not disproportionately large, the mass of the head is observed to rotate upon the cervical axis, as I before remarked, sometimes threatening to carry the chin towards the sacrum, and sometimes flattering the accoucheur with the prospect of its speedy arrival at the pubis. The more important and useful knowledge is that which teaches us the nature of the accident, and the appropriate indications of treatment. But we have already seen that the accident consists in an excessive departure of the chin from the breast, or failure of flexion; that is the first principle: and that the chief indication founded upon it is to restore the flexion by pushing up the forehead, and bringing down the vertex; and where that cannot be done, the next indication is to rotate the chin to the front, so that flexion may take place as soon as possible after the chin has emerged.

I am not capable at present of stating the number of face cases I have had occasion to treat. The number has been considerable. The result, as to its influence on my opinion, is that they are rarely formidable when the great precept of bringing the chin to the pubis is understood and can be fulfilled. Certainly, I have not been, in a majority of my cases, called upon to use any extraordinary measures of relief.

I have a word of counsel for the Student as to the care of his own reputation in the conduct of such cases. There can rarely be met a more disagreeable spectacle than that of a new-born child's face, after a bad face-labor. It is frightfully suggillated, and often covered with blebs filled with yellow or bloody serum: the lips are completely in a state of ectropy, the eyes closed by infiltration of the palpebræ, and the nose enormously swollen. Bystanders cannot comprehend why these appearances should exist in a neonatus that has been tenderly treated—and are therefore too apt to assign as the probable cause the rudeness and brutality of the medical man. As soon as the young beginner has surely made his diagnosis, let him announce the probability of a swollen and blistered face, notwithstanding the gentleness of the treatment which he is about to administer. In this way he may save and augment not only his own credit, but that of his art, a pleasing duty for every true scholar.

As I shall have occasion to revert to the consideration of face-positions when I come to treat of the various uses of the forceps, I shall close the present chapter, in order to take up the consideration of those labors in which the child presents the breech, knees, or feet, when descending.

CHAPTER XII.

ON PRESENTATIONS OF THE PELVIC EXTREMITY OF THE FŒTUS.

As the length of the gravid uterus, at full term, does not exceed twelve inches, and as a well grown fœtus is nineteen or twenty inches in length, it is evident, as I have already said, that it must, while in utero, be folded up in a very compact form, and that it will be an oval body, one of the extremities of which ought to be directed towards the orifice of the womb, and the other to the fundus. The most natural position of the fœtus is certainly that in which the head points downwards; so that the vertex, or some other part of the head, may, in labor, advance first. But it happens that about one in every forty-five or fifty cases presents the other extremity of the ovoid to the os uteri; and in doing so, it is a matter of mere chance whether the breech, or the knees, or the feet, prove to be the presenting part. In strictness, the breech ought to descend first in these labors, but if the feet happen to be near when the membranes give way, they are quite likely to prolapse into the opening, and pass, soon afterwards, out at the vulva; so that, supposing the breech presentation to be, after that of the vertex, the most natural, we may properly include, in the account of the presentations of the pelvic extremity, those of the knees and feet, and regard them as mere accidents of the pelvic presentations, and all to be included under the head of natural labors, agreeably to the doctrine expressed in a former page of this work—a doctrine that announces two essential presentations of the fœtus, one a cephalic, and the other a pelvic presentation; each of them is liable to the accidents appurtenant to their form.

It is not an easy matter to determine why the breech presentation occurs about once in forty-five or fifty labors, and it is far less easy to say what is the reason that certain women are prone to this sort of labor to such a degree as to bring all their children so. I knew a woman whose children, four in number, were all born with the breech presentation, and it is by no means very rare to meet with persons who have been similarly situated in more than one of their labors.

Dr. Collins, of Dublin, in his *Practical Midwifery*, informs us that one woman who was delivered at the Dublin Lying-in Hospital had preternatural presentations in every one of her labors, and she had given birth to nine children. While that gentleman was master of the Dublin Hospital, sixteen thousand four hundred and fourteen women were delivered, of whom three hundred and sixty-nine had presentations of the breech, feet, or knees; making rather more than one such labor in every forty-five cases. Out of 54,723 labors stated by Boer, Bland, Merriman, Boivin, Lachapelle, and Nægèle, there were 1694 cases of breech, feet, or knee presentations, which give us one pelvic presentation in thirty-two and one-fifth cases nearly. It is commonly assumed that about one in forty-eight, or more generally two in 100 cases will prove to be pelvic presentations.

Causes of Pelvic Presentations.—The causes which produce these presentations must be purely accidental. The most natural presentation is that of the head, which is turned towards the os uteri from the earliest period of pregnancy. The insertion of the navel-string is nearer to the pelvis than to the head of the child, the head therefore hangs downwards; but when the cord, by the growth of the ovum, has become of a very considerable length, the child ceases to be dependent from it, for the cord is not unfrequently from twenty to thirty inches long. It seems very probable that while the fœtus is yet small, it may change its position in the uterus; but if it happen to turn as late as the fifth month, it will be apt to retain the attitude it may then acquire till the end of the pregnancy, as its length does not admit of its changing again very readily after that period. It is not to be doubted, however, that the attitude may, by certain extraordinary or violent movements of the mother, be reversed, at a later period, so that the head, which was originally at the os uteri, may be afterwards brought to the fundus, and *vice versâ*. Prof. Paul Dubois, of Paris, has an article in the *Mém. de l'Acad. Royale de Méd.*, in which he endeavors to show that the child does turn its head downwards in consequence of a certain instinct at about the seventh month, but I am far from being convinced by his arguments.

Some persons will not agree with me in regarding the pelvic as a natural labor; yet notwithstanding the breech presentation is met with only once in forty-five or fifty labors, I am not inclined to regard it as a preternatural case, for I cannot discover any reason for classifying it along with that sort of births, in the mere fact that the head does not present. The breech composes one end of the fœtal ovoid; and a breech labor requires, for its complete success, no greater dilatation than that demanded for the passage of the head; it may be effected without any aid, and is, perhaps, not really fraught with greater danger for the mother than the other, the common vertex presentation. It is, however, far more dangerous for the child than the vertex case ; and as the object of parturition is the safe birth of the infant, it might be absolutely proper to include, in the class of preternatural labors, all those in which the child is exposed to unusual hazard. Still, many breech presentations terminate favorably with great celerity and without any artificial aid, whence I look upon them as not really preternatural.

In former times these presentations of the pelvic extremity of the fœtus were regarded as much more serious events than they are at the present day.

The ancient Romans used to call all those persons that were born by the pelvic presentation Agrippas, as is seen in the following passage from Pliny, lib. vii. cap. viii.; and all such labors were regarded as not natural.

"In pedes procedere nascentem contra natura est, quo argumento eos appellavere Agrippas ut aegré partos; qualiter M. Agrippam ferunt genitum unico propé felicitatis exemplo in omnibus ad hunc modum genitis."

If the birth of Marcus Agrippa were really the only instance of a safe delivery of the child in a breech presentation, we should not have occasion for surprise at Pliny's opinion as to the preternatural character of such labors; but doubtless, thousands of Roman children must have been safely born so, and that without any assistance in the birth.

That sprightly and most delightful old book—the first Midwifery book ever printed in England—I mean the "Byrthe of Mankynde," by Thomas Rainald, Lond., 1565, at Fol. liii., has the following:—

"Agayne, when it proceedeth not in due tyme, or after due fashion, as when it commeth forth with both feete, or both knees together, or els with one foote onlye, or with both feete downwards, and both handes upwardes, other els (the whiche is most perillous) sidelong, arselong, or backlong, other els (having two at a byrth) both proceade with theyr feete fyrst, or one with his feete, and the other with his head, by those and dyvers other wayes the woman sustayneth great dolour, payne and anguishe."

Thomas Rainald would be very much surprised and comforted could he see what facilities modern science has provided for the obviation of all these terrible occurrences.

The danger to the child, here depends on its liability to asphyxia, from several causes: first, from the compression of the cord, which is pressed betwixt the child and the parts from which it is escaping; second, from the detachment of the placenta before the head is born, by which the uterine life of the child is destroyed before its birth; thirdly, the compression of the placenta itself betwixt the uterine parietes and the head of the infant; or fourthly, the constriction of the placental superficies of the womb, during the time that the child's head, still remaining in the vagina and lingering there, ceases to distend the uterus, which closely contracts on the after-birth, and even though still retaining its connection with it, yet suspends all the utero-placental operations, on which the fœtus depends for existence antecedently to the establishment of its respiration.

The last named cause is, I presume, the one chiefly to be feared; and I have long deemed the pressure upon the umbilical cord, in breech cases, a matter of small moment as to the child's security, in comparison with the asphyxiating influence of the compression, detachment, or constriction of the placenta by the reduction of the superficial content of the placental seat. It is probable that that seat, which is eight inches in diameter before the commencement of the labor, is diminished to a diameter of four or even perhaps three inches by the time the head is driven out of the womb into the vagina in breech cases. Under such a reduction, no valid placento-uterine intercommunion can be supposed possible. Very often it must happen that the whole placenta is off long before the head gets even out of the womb and into the vagina.

The breech may descend into the excavation, and it may even pass through the vulva, without the least danger of compressing the cord; but when the body of the child has sunk so low as to bring its navel down into the bony pelvis, there is little danger that the arteries of the cord shall be completely obstructed for a period long enough to give the child a fatal asphyxia. Such an event is far more likely to occur where the feet present than where the breech advances; because, in the latter case, the thighs, and generally the legs, are extended along the front of the body in such a manner as to protect the cord from pressure, its vessels being fully guarded by its position betwixt the thighs, during all the time the body is escaping; thus enabling the infant better to bear the temporary pressure on the cord for the short time it must be compressed by the head only, while that part stops in the excavation; longer pressure by the head would easily extinguish the remains of a life that was already about to expire from preceding obstruction of the circulation. In general, the danger for the child is not great until the head has sunk down into the excavation, because it commonly does not take a great deal of time for the whole of the body to pass through the dilated canal of the vagina; but the head, being subject to arrest while in the passage, may there fatally compress the cord betwixt itself and the bony sides of the pelvis.

We know that the prolapsion of the cord, in an ordinary vertex labor, is very apt to occasion the death of the fœtus; and it is therefore easy to perceive that such compression of the cord, between the fœtal head and the pelvis, is here the real cause of the loss of the infant. From this we might naturally suppose that those children that are lost in breech and footling cases are lost from the same cause, to wit, a compression of the cord. But I believe upon evidence, that the placenta is often detached as soon as the breech or even the head leaves the uterine cavity: and if so, then the child is rather lost from the suspension of the placento-fœtal circulation by the afore-mentioned detachment, than from the compression of the cord only.

Fatalities in Breech Cases.—I think it probable that more than one child in every five that presents by the breech, or feet, or knees, perishes in the birth. Certainly, if we may judge from what Pliny says about the Agrippas, in the passage quoted but a little while ago, the highly civilized people of Rome, and probably the ancients in general, looked upon these labors as replete with danger, and hence, if four out of five children born in this manner escape with life, such a success is as much as we ought to expect—all the world over. In large lying-in hospitals, perhaps, the proportion of fatal cases is rather less unfavorable, in consequence of the prompt attention always paid in such establishments to the parturient female, and to the greater skill and dexterity acquired by abundant opportunities of practice. Of Dr. Collins's cases, 369 in number, of breech, feet, and knee presentations, 234 were born alive, and 135 were born dead—some of which were putrid, premature, &c.

In Dr. Cazeaux's *Traité Théorique et Pratique de l'Art des Accouchemens*, a work published in Paris in 1840, and which is said to enjoy the very highest favor in France, there are the following remarks upon the subject of the danger to the fœtus in pelvic presentations. I translate it, as containing a late novelty upon the subject. "Delivery by the pelvic extremity is very dangerous for the child. The statistical results furnished by Madame Lachapelle prove that, out of eight hundred and four presentations of the pelvic extremity of the fœtus, one hundred and two children were born feeble, and one hundred and fifteen were born dead. The proportion of dead children to the whole number is one-seventh; whereas, in 20,698 vertex positions, there were only 668 dead born; which is one in thirty, or about one-thirtieth. As to the prognostics of the several sorts of pelvic presentations, it has been remarked that, when the breech comes down first, the number of dead born is about one to eight and a half, which is about an eighth and a sixteenth. In footling cases, one out of six and a half die, a sixth and more; and lastly, for the knee cases, one out of four and a half."

M. Cazeaux goes on to say that the above is not a fair representation of the dangers to the child in these cases; for these results do not exclude those cases of dead born that are not properly assignable to the presentations as causes of the death; the statements ought to exclude putrid fœtuses and deformed children; and he states, as the opinion of M. P. Dubois, that, setting aside all the cases in which the children appear to have been lost from causes not connected with the presentation, M. P. Dubois has arrived at this result, that in labors with footling presentations, there dies one child out of eleven, whilst in presentations of the head there dies one out of every fifty. It is plain that the difference is frightful.—P. 359.

Diagnosis.—It is a question whether the nature of the presentation can be discovered by reference only to the movements of the fœtus in the latter stages of gestation. Some persons have foretold that the child was improperly placed, judging it so to be by feeling a greater degree of motion in the pelvic region than in the upper part of the uterus. It seems not difficult to believe that, if the motions of the child should be chiefly felt towards the cervix uteri, they ought to be accounted for by referring them to the presence of the feet in that quarter.. However, I feel assured that those patients whom I have attended, and whose labors were accompanied with this presentation, were in general utterly unsuspicious of it in pregnancy; and they are, commonly, ignorant of it until the child is born. It is not rare, indeed, for women to fear that the child is to be born double, as it is called, when the vertex really does present; and some patients are quite convinced the child is wrongly placed, until labor comes on to prove their fears ill founded. There may be some certainty obtained by a diagnosis derived from the stethoscope applied to different parts of the uterine region; for, if the child's head be directed towards the fundus uteri, there will be heard, in consequence, a pulsation of its heart at a higher level than if the head occupy its more natural position—probably near the navel; but there will always remain some liability to wrong impressions, if they be derived from auscultation alone. The surest way is that of the Touch, which is scarcely to be confided in except at the commencement of labor, or at a period when the presentation can be touched with the tip of the finger.

When the breech can be reached per vaginam, it ought to be recognized by its mass filling up the pelvis; by its softness, and its fleshy feel, so different from that of the fœtal head; by the tubera ischii; by the point of the coccyx, the anus, and the organs of generation, male or female; by the spines of the sacrum, and by the sulcus found between the nates and the thighs, which tend upward from the presenting part; I may add, also, by the meconium, which is often discharged at a pretty early stage of labor, and comes away with the waters on the hand of the accoucheur; but let not the young accoucheur be deceived by this symptom, since it is possible for portions of the meconium to come away even in the best vertex position. It is also to be observed that the form of the bag of waters is commonly not so much like a segment of a sphere in the presentations of other parts than the head. In breech presentations, it is more like an intestine in shape, sometimes descending to the very orifice of the vagina, and yet not very considerably dilating that passage.

Notwithstanding we ought to be able clearly to distinguish betwixt the breech and the head presentations by the first touch, it is, I think, not very uncommon for us to make a great mistake, if I may judge from the instances of mistakes that have come under my knowledge; but I am sure that such errors are the results of mere carelessness, and they could therefore always be avoided. Let it not be here understood that, when the true nature of the presentation is known, it ought to be communicated to the patient; on the contrary, it should be carefully concealed from her, as not calculated to promote her easy deliverance, since she attaches to the circumstance the idea of greater suffering or danger, which, by depressing the powers of her mind, would be very apt to affect, in an injurious manner, the pains or the voluntary efforts that she ought to have in their greatest vigor. While the nature of the case, then, is carefully concealed from the patient, it should be formally announced to her husband, or to some responsible person, and all the hazards of such a situation for the infant should be explained, in order that, if any untoward incident should cause the infant to be still-born, no unjust imputations might lie against the candor, the skill, or dexterity of the accoucheur.

Not to bring down the Feet.—When the breech is found to be the presenting part, it is very natural to suppose that, could the feet be brought down, they would give us the command of the child, so that we could very greatly assist in its delivery; and this is quite true; nevertheless it is bad practice to bring the feet into the vagina, except for some very well understood and sufficient cause. When the child descends *double*, as it is called, the parts yield very slowly for its advance, and this tediousness is a necessary consequence of its bulk, and the yielding nature of its substance. Unlike the head, which is hard and firm, this part, when urged downwards by the pains, gives way before them, and is compressed so much that each pain is half lost in compressing the yielding mass before the part becomes firm or condensed enough to make it act as a dilater. This slowness is greatly to be deprecated; and all proper means to obviate it may be safely resorted to, such as a venesection, or the administration of a clyster or a dose of castor oil, &c.; yet this very slowness, and the great size of the breech, serve as means for the child's security, at the last moments of labor. By their means the os uteri, vagina, and vulva are so completely opened, become so absolutely cylindrical, and are so entirely deprived of the power of resisting, that, when the head comes to take the place of the body in the excavation, a very little force of the woman's straining serves to extricate it; or at least the complete dilatation enables the accoucheur to employ his hand or his forceps to extract the head in time to save the child from an asphyxia, which is almost sure to affect children that are not born very soon after the escape of the shoulders, during the whole time the head is passing the vagina; for the placenta would be now so completely squeezed by, or even separated from, the womb, that the utero-placental functions must cease to be performed.

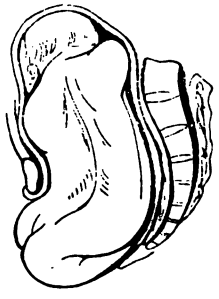
The impatience, which can scarcely be avoided when witnessing the throes of the mother or the struggles of the child, also exposes us to the danger of doing it a great harm by pulling strongly by the breech, shoulders, &c., in order to get both mother and infant the more speedily released; but if any one will take the time to reflect that the spinal marrow may be greatly injured by a violent extension of the neck, it will be evident to him that no very great amount of extracting force ought to be applied. It is best, therefore, as a general rule, to permit the breech to descend, and not in any manner to interfere with the feet until they are spontaneously born: an extracting force has also an invariable tendency to slip the arms upwards, so as greatly to embarrass the last and most important act of the breech labor. The child is wholly expelled by the uterine contraction, being pushed out of the womb in consequence of the approach of the fundus to the cervix of that organ: in that natural process, if the arms happen to be resting on the sides of the abdomen of the child, they ought to descend *pari passû* with the parts on which they rest; but if the child be pulled out, then, as the fundus uteri does not press with a proper power upon the head, the arms will naturally slip up over or alongside of the head, where they sometimes are so firmly fixed as to make it a very difficult matter to bring them down again. Hence the soundest discretion teaches us to let the womb push forth the breech as we let it push forth the head, in vertex labors, without laying hold of it to drag it downwards as soon as the least purchase can be had on the presenting part.

The legs, in a breech presentation, may be turned upwards on the child's belly, or they may be flexed on the thighs, so as to bring the feet very near the nates. If the breech engages in the pelvis, or begins to pass the circle of the os uteri, the feet disappear, rising as the nates descend. There is no danger of injury to the hip or knee-joint, if the child be trusted to the natural powers employed for its birth or expulsion; but whenever much force is employed by putting the fingers in the groin, we do incur the hazard of breaking or dislocating the thighs.

Positions of the Breech.—The breech may have one of four positions: 1st, the child's back to the left acetabulum of the mother; 2d, to the right acetabulum; 3d, to the pubis; 4th, to the promontory. These several positions are easily discriminated in practice by the Touch, which ought not to mislead any attentive or considerate practitioner, since by the Touch it is easy to learn where are the coccyx, the tubera ischii, the genitalia, the sulcus betwixt the thighs, the sacrum, &c. &c.

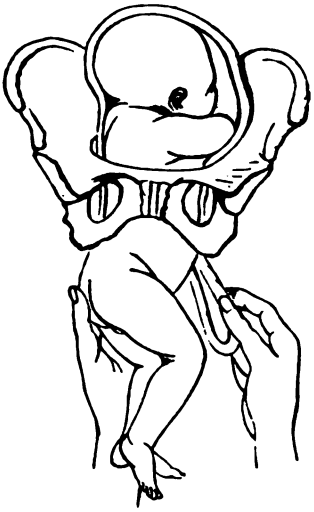
As the escape of the breech occasions a great distension, the perineum requires very steady support by pressing a soft napkin against it, for the purpose, first, of resisting its too rapid advance, and second, in order to give to its movement that curvilinear direction which ushers it into the world in a course coinciding with the line of Carus's curve. Figure 85 exhibits to the Student the appearance of bending which is acquired by the pelvic extremity of the trunk while passing outwards in a breech labor. It is manifest that the perineum may be here subjected to a great degree of distension. As soon as the body is so far born as to permit the navel-string to be reached, it is to be drawn downwards a little, so as to free it from the danger of being broken

Fig. 85.



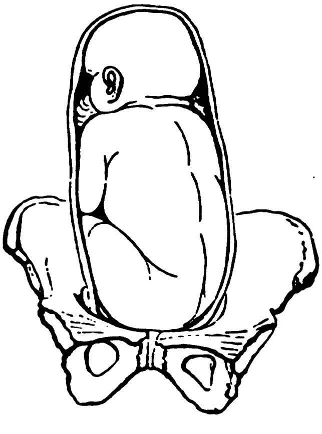
off, or the other danger of a too early detachment of the placenta. It is easy to draw a considerable loop of it downwards, by pulling at the yielding portion, as in Fig. 86. As soon as the feet are delivered and extended, they, as well as the body, should be wrapped in a napkin, in order that the skin may not suffer any injury, and also for the purpose of enabling the accoucheur to hold it more firmly, which he could not otherwise do on account of the viscous nature of the substances that adhere to it soon after it emerges.

Fig. 86.



First Position.—In the first position of the breech, the child's left hip should rotate to the left towards the pubis, so as to allow the sacrum to glide down along the left ischium, and the right hip to fall into the hollow of the sacrum. Fig. 87 shows this pelvic presentation *in sitû* before rotation, while Fig. 85, above, exhibits the appearance after the rotation has taken place. But after the hips are fully delivered, they recover the obliquity of their former situation, and the body continues to descend so, until the shoulders, entering into the pelvis in an oblique direction, come to rotate as did the hips; the left shoulder advancing to the pubis, as the hip did, and the right one falling back into the hollow of the sacrum. In Fig. 86, the right shoulder has come to the pubis and the left to the sacrum. When the shoulders do not come down well, a finger should be passed up so far as to reach above the one that is nearest, to depress it by drawing it downwards with the finger, which commonly suffices to cause the arm to escape. But if the arm does not descend readily, let the finger be slid along its upper surface to a spot as near as may be to the bend of the elbow, and then the elbow may be drawn downwards with considerable force, and without any danger of fracturing the os humeri. One arm having escaped, there

Fig. 87.



will be little difficulty or delay in getting the other down, especially if care be taken to move the body, rotating it in a line of direction opposite to or away from that part where the arm is detained.

As soon as the arms are delivered, an examination should be made in order to learn how the head is situated. If the face is found in the hollow of the sacrum, and the chin well down towards the fourchette, it is well. The child's body ought now to be raised upwards on the practitioner's arm, to a height sufficient to enable the longest axis of the head to become parallel with the axis of the vagina, and the patient should be urgently exhorted to bear down and force the child's head out of the passage; for at this time the head is not in the womb, but in the vagina, and for its expulsion there is required rather the effort of the abdominal muscles than that of the uterus, which doubtless does, in many instances, partially close its orifice above the vertex, in this stage of a footling or breech case. If the patient therefore does not make a very great effort of bearing down, or expulsion, the head must remain in the passage; during all which time the child is exposed to the risk of perishing by asphyxia. It is true that the pressure of the head upon the parts tends to produce a violent tenesmus, which compels the woman to strain very much; but it is also true that in some instances she will not make the smallest effort, unless urged or commanded in the most earnest or even vehement manner by the physician. Should the Student make the grave mistake of waiting for a pain, he might lose the child. Let him not forget what I have above said, viz., that the child's head is out of the womb and in the vagina, and that the action of the womb has nothing further to do with it; for the expulsion of the head is now to be effected by a tenesmic, and not by a womb-contraction.

Some aid may be given at this critical moment by drawing the child downwards; but the attendant should always carefully reflect, while employing any extractive force, that the child's neck will not bear a great deal of pulling, without the most destructive effects on the spinal marrow. Certain it is that the infant in the birth will not safely bear more force applied to its neck than one after the birth, a reflection that ought to regulate the physician always, who should remember that the infant will not safely bear a more violent pull by the neck in this situation, than it would if dressed and lying in its mother's arms. Such a reflection would be a very useful one for the occasion.

If all his exhortations should fail of causing the woman to assist him by bearing down, let him endeavor to preserve the child from suffocation by passing two of his fingers upwards until they reach the two maxillary bones, and cover the nose; by doing this, the backs of the fingers, pressing the perineum backwards, serve to keep an open communication with the air, and the child can breathe very well until the tenesmus comes on. I have kept a child alive in this way, breathing and sometimes crying, for twenty or twenty-five minutes before the birth of the head, and thereby saved many a life that must have been lost but for this care. At last the head descends and escapes from the vulva very suddenly, after which, the placenta having been duly attended to, the delivery is complete; whereupon the patient may be put to bed.

Second Position.—The rule for managing this case is the same as that for the first position. Here the sacrum of the child is to the right acetabulum of the mother; the right hip to her left acetabulum, and the left one to her right sacro-iliac symphysis. As the presenting part descends, the right hip comes to the pubis, and the left falls into the curve of the sacrum.

Third Position.—Here the sacrum of the child lies behind the pubal symphysis—its right trochanter to the left ischium, and its left trochanter to the right ischial plane. In any such case, there will be rotation, converting it into one of the first or one of the second position, as accident may determine. It requires no further observation in this place.

CASE.—A few years ago, I was engaged to attend a young woman in her first childbirth. When she fell in labor, I discovered that the breech presented. Her residence was about three-fourths of a mile from my house. I was very much inclined to send for my forceps, for fear that when the head should come at last to occupy the vagina, I might be unable speedily to deliver it: but as she was exceedingly delicate and timid, and her friends anxious, I deferred sending for them lest needless alarm should be the consequence of bringing them to the house. The labor proceeded favorably until the shoulders were free, and then, notwithstanding the head took the most favorable position, I found no exhortation or entreaties sufficient to make the woman bear down, and the child soon became threatened with asphyxia, which I obviated by admitting the air freely to its mouth and nostrils, by pressing off the perineum, as before explained. The child cried from within the vagina, and I felt a hope that the forceps, which I now sent for, would arrive in time for its succor. The instruments were placed in my hands in the shortest time possible. In two minutes after I received them they were applied, and the head withdrawn, but it was too late to resuscitate the child. I have never since failed to order my forceps to be placed within my reach in any case of footling or breech labor, and I feel well assured that the consequence of this care has been the saving of several lives that must have been lost but for this precaution. I have lost but few children in pelvic presentation of late years. It is my invariable custom to order a forceps to be got in readiness as soon as I ascertain that the presentation is not one of the head; and I feel well assured that such a precaution, if generally observed, would preserve many a life that would be lost, either by delay in the delivery of the head, or by pernicious attempts to extract by pulling at the neck, to which the temptation is so strong in moments of great anxiety for both parent and offspring.

It is so unpleasant an event in the practice of Midwifery to lose a child in the operation, that the accoucheur ought to take all the precautions possible to free himself from reproach, which he shall scarcely escape, in consequence of the utter ignorance of the nature of parturition even in what is called educated or good society.

CASE.—On the 11th of September, 1848, I visited a primipara lady in labor, at 7 A. M. She had been in sharp pain from 10 P. M., nine hours. The os uteri was not so large as the end of a finger. Upon ausculting and examining by palpation, I determined a pelvic presentation. At 12 M., I thought the labor would continue until morning, so slow was the dilatation; but at 5 the membranes gave way, and all the liquor amnii came off, the os uteri being still rigid and irritable. The bands of the upper os uteri were more tense and unyielding than those of the os tincæ proper. The child was still in health, as ascertained by the regular action of the heart. I had announced all the hazard for the child early in the day. My forceps was at hand; at 8 P. M. the head was thrust into the vagina, and, as I failed to deliver it with my hands, I applied the forceps and speedily drew out the head. The child was quite dead. There was no motion of the heart. When I drew down the feet, I found there was no vital tension in the limbs. Now I feel sure that this child perished by asphyxia from the unmitigated pressure of its placenta against the head consequent to the discharge of the waters. It perished of course before the operation. How could I, by any careful obstetrical measure, have saved it? I regretted, upon finding it dead, that I had not repeated my auscultations, after the rupture of the ovum. Had I done so, I should have been able to announce the loss of the child long before the midwifery operation became possible. I do not suppose that I am blamed by its friends, but a young accoucheur would feel less uncomfortable in such a case for having announced his prognosis. Hence, let the Student remember to auscult often towards the close of pelvic labors.

Fourth Position.—In those cases in which the sacrum of the child is directed towards the mother's back, it is highly desirable so to conduct the labor as to effect a complete rotation of the child before the head begins to get fairly into the excavation. If this change does not take place spontaneously, or by the skilful interference of the accoucheur, it must happen, at the last and most important stage, that the chin will be to the pubis, and then there will be some difficulty in obtaining the requisite dip of the head or its due flexion. It is exceedingly dangerous for the child to be so situated, but happily there is a method by which it may be hopefully-assisted.

As soon as the shoulders are fairly freed from the vulva, the edge of the perineum tends to compress the neck of the child, and force it upwards against the arch of the pubis. In some cases, the perineum is so strong or elastic as to exert a considerable power in this way; and it is clear that, if it be not counteracted, the chin may be lodged upon the top of the symphysis of the pubis, which will wholly prevent the flexion of the head from taking place. For, if the perineum should press strongly on the nucha, it would push the front of the neck or throat hard against the symphysis, so as to prevent the chin from coming down. Under such circumstances, the child speedily perishes. The indication is to push the perineum back again, or carry the child far back towards the coccyx, and afford space enough to let the chin descend, either spontaneously, or by pulling it down, after introducing the fore and middle fingers of the right hand into the mouth. As soon as the chin is well brought down, the woman should use all her power to assist in the expulsion of the head. I have found that the best attitude for the mother, in this kind of delivery, is that which is advised for forceps operations, to wit, that in which she is placed on her back with her hips brought quite over the edge of the bed, the feet being supported by two assistants; so that, when the shoulders are delivered, the child may be supported almost in a vertical posture, as if standing, by the left hand of the accoucheur, while his right hand aids in the delivery of the head. I am sure that much greater command of the labor may be had in this position of the patient than in any other that can be devised.

But, as I have already observed, we should always endeavor to manage the case so as to get the face into the hollow of the sacrum, instead of letting the chin come to the pubis. If, therefore, the breech sink into the excavation in this unfavorable manner, we should, by pressure with two or three fingers, endeavor to force that hip which is nearest the front towards the symphysis, and if we succeed in effecting its delivery in that position, we should, with a proper degree of force, continue to turn the forward hip more and more round, so as to bring the child's spine at least as far in front as the ramus of the ischium or pubis; so that, when the shoulders begin to enter, they may enter obliquely, and that, after they have passed down, the head may also enter obliquely, or at least transversely. For example, let the sacrum be towards the mother's back, the child's right hip will be on the right ischium of the mother. We might try to get the right hip towards the ramus of the ischium, then towards the ramus of the pubis, and, as it advances, cause it to emerge just under the arch. When fully emerged, the hip should be turned more and more round to the left of the mother, so as to let the right shoulder enter the brim at the left acetabulum, afterwards to escape under the arch, in doing which the child's chin will enter near the left sacro-iliac symphysis, or at least near the left ischial plane, and at last slide into the hollow of the sacrum, as in the second position of the breech.

Where, in consequence of the grasping force of the womb holding the child's body tight during a pain, this desirable rotation cannot be gently effected, we ought to watch for an opportunity, during the absence of a pain, to push the child's body upwards again as far as we conveniently can, and then draw it downwards, endeavoring, while pulling it downwards, to twist or rotate it in the manner that is required, and above recommended.

If, on the other hand, we endeavor to bring the left hip to the pubis, we shall also get the left shoulder there; and at last, compelling the face to enter at the right sacro-iliac symphysis, we shall terminate the labor as in the first position of the breech.

CASE.—I shall here relate a case taken from my record book, which may serve to show the Student what a great rotation may be effected by the hand of the practitioner, in cases of the fourth position.

Tuesday, October 5th, 1830. Mrs. J., a young woman in her first pregnancy, sent for me at eight o'clock P. M. The waters had come off at five o'clock P. M. The os uteri, at my arrival, was almost completely opened. I touched the breech and feet; the toes were towards the left acetabulum. At a quarter before nine o'clock, I disengaged the right foot, and then the left one. At nine, the arms were both delivered, the left one escaping first along the perineum, and the right one under the pubis. I could not effect any further rotation, and was sorry to find the chin immediately behind the symphysis pubis. I then turned the child's body on its axis, and pulling the chin well downwards pressed the face with two fingers, on its right side, and with great ease turned it into the hollow of the sacrum. I next made a channel by passing up two fingers to the superior maxilla, so as to admit air freely to the nose, and the infant breathed; there was a total cessation of pulsation in the cord. The child breathed and cried at least twenty minutes before the head was extracted, which I could not effect until I carried its body upwards towards the mother's abdomen, and rolled her over on her right side, which gave me far better power to aid her with my right hand. The infant was born living, and did well. Let the Student remark that I turned the woman on her right side at the close of this labor. I wish that, in any case where he encounters delay or difficulty, yet not to such an extent as to demand the forceps, he would, at the last moment, turn his patient upon her right side, so as to enable him to make use of his right hand in assisting to make the head roll out under the crown of the arch. The fingers of the right hand are stronger and more apt than those of the left, and in these cases, where expedition in the operation is so essential to safety, it is desirable to obtain even this not inconsiderable facility and advantage.

CASE.—On Thursday, July 14th, 1836, Mrs. ——— was seized with labor pains, which came on with a rupture of the membranes. At six o'clock, I made an examination, and found the left foot in the vagina, accompanied by the umbilical cord, which pulsated. The toes were directed to the pubis. I could reach the breech of the child, but the right foot was so high up that I could not touch it. In a short time the left foot came quite down; and in order to rotate the body I drew moderately upon the foot, which caused the left hip rapidly to approach the pubis. I could not even yet get at the right foot, wherefore I permitted the child to descend with that limb pressed upwards against the belly; the left hip came under the centre of the arch, and, as soon as I could command it, I turned it more and more round, so that when the arms were delivered I found the face in the sacrum, soon after which the head was expelled. I immediately ascertained that there was a second child; pains came on, and in fifteen minutes after the first one was born, I broke the membranes of the second, which presented the nates and the right foot. The foot prolapsed, but the other limb was pressed against the child's belly, so that I could not get it; the sacrum was to the right acetabulum. When the shoulders were delivered, I found the child's face rather transversely directed towards the left ischium. I brought it into the hollow of the sacrum, soon after which it was also expelled. Both children were well.

It is so easy a matter, in general, to cause the body to rotate during its transit through the pelvis, that it very rarely happens, if the physician is called early, that the face at last is found towards the pubis.

With regard to the presentations of the feet and knees, I do not feel that it is necessary for me to enlarge upon them before I close this chapter, inasmuch as the footling case is a mere accident happening in a pelvic presentation, and which, moreover, can never prevent it from being at last a pelvic presentation—for all footling and knee cases are certainly breech presentations. I may remark, however, that the knee presentation is found to be embarrassing from the tendency there is to a sort of arrest, in consequence of the knees abutting against the sides or parietes of the pelvis, which is sufficient to prevent the descent of the child's nates, so that they, being thereby thrust over to the opposite side, cannot enter the excavation. Hence, where the knee presents it is advisable to convert it into a footling case, which can be done by pushing the whole presentation upwards, during the absence of pain, in order to gain space enough to bring down the feet.

The Student will perceive, if he refers to the axis of the womb and that of the vagina, that in a knee case, in which the child's back is towards the left front of the mother, the thighs would be very greatly extended, or bent backwards, before they could emerge from the external organs; an extension that must be very difficult to effect where the legs are bent up on the back of the thighs—for in such circumstances the rectus femoris, and indeed the whole quadriceps muscle must be put excessively on the stretch. It is a good rule, therefore, in knee presentations, to get the feet down as soon as it can be prudently done; whereas, in the well defined breech cases, the feet ought not to be brought down, except for some valid and well-understood cause.

In order to distinguish the feet from the hands, for which they are sometimes mistaken, it is only necessary to give attention to the sensations imparted by the operation of Touching. The even range of the ends of the toes, and their shortness, compared with the length o the fingers; the closeness of the great toe to the one next to it, i contrast with the wide separation of the thumb from the forefinge the ankle and the heel, are marks that might be supposed sufficientl prominent to guard us against even the danger of mistake; yet ver great attention is in some instances required to enable us to aver positively that the presenting part is, or is not, the foot.

As the footling is but a deviation from the breech presentation, its positions are like the original four—namely, the heels to the left acetabulum; the heels to the right acetabulum; the heels to the pubis; and lastly the heels to the sacrum. As the treatment is precisely the same as in presentations of the nates, I shall not detain the reader by any further remarks upon the management of them.

CHAPTER XIII.

OF PRETERNATURAL LABOR.

Any labor that cannot be brought to a safe conclusion by the natural powers of the system might properly be denominated a preternatural labor; and, as the causes that might prevent the accomplishment of the parturition, save by the intervention of our art, are very numerous, it follows that there are a great many kinds of preternatural labor.

Causes.—A labor may be accidentally changed from a natural to a preternatural one; or it may possess a preternatural character from the very beginning, and be unavoidably so. Thus, a woman may have brought her child almost into the world without any appearance of disorder, or danger, or uncommon distress, and be then suddenly attacked with convulsions, apoplexy, hemorrhage or laceration of the womb, &c. &c., either of which occurrences completely changes the character of the labor. Or she may, in consequence of disease or accident, be found incapable of bringing her child into the light without surgical aid; as, where the passages are closed by stricture, or by some fibrous tumor, or by a deformity of the bones of the pelvis. Lastly, the labor may be preternatural because there presents at the strait some portion of the child which cannot pass through it, but must be put aside in order to let some other part advance, before the labor can be brought to a close. For example, if the arm or shoulder should present, it is necessary to put them out of the way and bring the head back to the opening, or else the feet must be brought there, the child being for that purpose turned quite over; for have we not learned that one or the other of the extremities of the fœtal ovoid must advance, in order to admit of the escape of the child?

It appears from the above that the causes which constitute preternatural labor are very various; and it is reasonable to infer that the medical and obstetric treatment of the several cases will be founded upon the peculiar and distinguishing character of each individual example of the labors. The subject, therefore, embraces so wide a field of discussion and detail, that it will be requisite to treat it according to the nature of the several causes that happen to interfere with the usual process of childbirth; whence I shall endeavor to describe the different sorts of preternatural labor according to the circumstances that make them what they are, and point out the modes of treatment most suitable to their several natures.

Perhaps it matters not which kind of preternatural labor is here first treated of, for there is no natural order or method of their occurrence; each one might be the subject of a separate monograph. Yet I have chosen to commence with the account of presentations of the shoulder, in which the operation of Turning is generally considered to be inevitable as a part of the treatment; and since that operation is not unfrequently resorted to in other kinds of preternatural labor, I deem it of some advantage to take an early opportunity of describing it in this connection.

I have already said that, in order to constitute a natural labor, one of the extremities of the fœtal ovoid ought to present at the opening; and I have treated of the pelvic presentations as being natural; and I have supposed that the knee and footling cases are but accidents or deviations of the natural pelvic presentation.

In presentations of the head, there is also, I said, a liability to deviations, by which the head glances off from the brim of the pelvis, whereupon it is either turned upwards into the venter of the ilium, or rises above the top of the pubis.

In a case where the direction of the uterus is very oblique, so as to allow the fundus to fall far down into the right flank of the patient, the child, if pressed by the contractions of the fundus, might be pushed towards the left side of the brim of the pelvis in such a manner as to make it doubtful whether the head would enter the strait, or slide upwards on the left side of the womb. For the most part, it fortunately happens, even in the very greatest lateral obliquity of the womb, that the head is not deflected, but enters the strait; but in a few examples it is found to rise upwards, instead of engaging. When this takes place, it must almost inevitably happen for the shoulder to fall into the cavity from which the head was turned away, and as the shoulder is a projecting part, it is very likely to maintain the position in which it is once ensconced. The shoulder, therefore, when the head glances off, descends or engages in the superior strait, and is pushed downwards by the uterine contractions as far as it can possibly be urged, and there it stops. The strait being now jammed full of a mass, composed of the shoulder, arm, neck, throat, and part of the thorax of the child;

so that no additional portions of the child can be pressed into it, a total arrest of the progress takes place, and the woman, after vain struggles, protracted according to the strength of her constitution, sinks at last, without the possibility of rescue from death except by the skilful aid of the obstetrician, or by the happy event of what is called a spontaneous evolution.

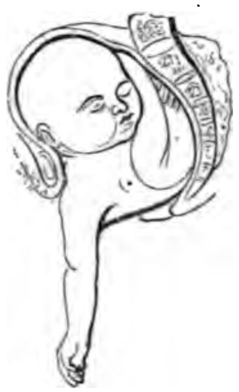
There can scarcely be any need for me to enlarge upon the impracticability of delivery here except by art; for even could the shoulder be pushed down as low as the vulva, it would happen, at last, that the head would be again brought to the strait from which it had been turned off, but it would be accompanied by the child's body, either of which, alone, is sufficient to fill the plane and the excavation, so that the two together could by no means pass through. The remedy is either to push the shoulder out of the way, and to bring the child's feet down so as to deliver it footling, or to restore the head to its proper place. There is, even where the operation is impracticable, an exceptional escape from death under these circumstances by the very rare occurrence of what is called spontaneous evolution of the fœtus, to be hereafter described.

I ought to remark that while the shoulder presentation is a deviation or accident occurring in an original head presentation, so it may happen that, instead of the shoulder, the hand or elbow may come down; but in fact they are mere circumstances of a shoulder case; and when they are advanced to a certain degree, it is the shoulder, after all, that fills the strait and the excavation, and which constitutes the presentation. The hand and arm are merely prolapsed, and their prolapsion adds nothing to the difficulty of the case; indeed, their prolapsion serves as a means of guiding us in our diagnosis, and does not at all oppose the successful treatment of the labor. In the management of a pelvic presentation, I should, in general, prefer that the feet should not prolapse; in a shoulder presentation, it would be rather a favorable circumstance for the arm to prolapse.

CASE.—Some months since I was in attendance in a labor case, in which, though the os uteri was very much dilated, and completely dilatable and distended with the bag of waters, I could not with the index finger touch the presentation. The patient was very much flexed, which relaxed the abdominal integuments. Upon placing my hand over the right iliacus muscle, I distinctly felt the orbicular mass of the child's head under my palm. Introducing the fingers, again, I waited until a pain came on. As soon as the bag of waters became tense from the pain, I pressed with my left hand, the head out of the right iliac fossa towards the chasm of the superior strait. I then ruptured the ovum, and exhorting the woman to "bear down, bear down," I had the pleasure to perceive the head driven quite into the excavation, and to find it born after a few minutes. Doubtless, I prevented the shoulder from coming to the os uteri by pushing the head to it.

Two Shoulder Presentations.—Two Positions for each Shoulder.—As there are two shoulders, a right and a left one, there must be a set of positions for each shoulder; but in determining what is the position of the shoulder, it is also necessary to determine the situation of the child's head. In speaking of natural labor with the vertex in the first position, I endeavored to explain the causes which give a greater number of first positions. The same reasons operate to produce, in shoulder presentations, a greater proportion of instances in which the head is to the left side of the pelvis, than those in which it is to the right side. Now if the right shoulder presents at the strait and the head is to the left, as in Fig. 88, the face of the child, and its toes and feet, will look towards the mother's back; but if the same shoulder presents, and the head is to the right side of the pelvis, the face and front of the child must look towards the mother's front: so of the left shoulder in the first position, the face will look in front, and in the second position it will look towards the mother's back. By speaking, therefore, of the positions of the two shoulders separately, we get a better and less complex idea of this sort of labor than we should have were we to enumerate a set of positions without such a division.

Fig. 88.



I think that the form of the fœtus, and the capacity of the womb, are such as to make it unnecessary to establish more than two positions for each shoulder: for example, for the right shoulder a first position, or that in which the head is to the left, looking backwards, and a second, in which the head is to the right, and looking front: for the left shoulder a first position, wherein the head is to the left, looking front, and a second, in which it is to the right, looking towards the back of the mother. This will, I think, be quite sufficient; and gives us four positions for the shoulders, hand, or elbow. It is not to be denied that the head might be in front, looking to the left, or looking to the right side of the mother, giving us in the former case a right shoulder, and in the latter a left one, in the strait; but it is needless to enumerate such a position, as the contractions of the womb and abdominal muscles would soon turn it into one of the attitudes I have before pointed out.

Diagnosis.—The signs by which a shoulder at the strait may be diagnosed are, 1. The want of the regular form of the bag of waters, which, in all preternatural presentations, is without that proper convex shape that we notice in favorable instances of natural labor: whenever the membranes pass down into the vagina, shaped almost like an intestine, or in a cylindrical form, there is good reason to think there is something untoward in the posture of the infant. 2. The spinous process of the scapula; the clavicle; the round-shaped shoulder; the axilla; the ribs; the arm, distinguishable by its size from the thigh, are evidences that a shoulder presents; but should the attendant retain any doubts, let him never omit to remove those doubts by the introduction of half his hand into the vagina, whereby he will be able freely to examine the nature of the presenting part, and learn its true position: no person is excusable for mistaking the diagnosis who knows he can command so infallible a method of making a correct one. The diagnosis can always be made in good time—that is, as soon as the dilatation will admit; and until then nothing can be done to aid the labor.

Turning.—Having ascertained that a shoulder is at the strait, there remains but one determination for the practitioner, and that is to put it away and bring another part of the child to present. This necessity, and the hazard in which, consequently, both the mother and child are involved, should be plainly and seriously laid before those who have the best right to know her case; namely, her husband or parents, or such near relative or friend as may seem to be, for the time, in *loco parentis* for her. The necessity for interference ought also to be explained to the sufferer herself, but in the gentlest and most cheering manner possible. If it be within the bounds of possibility to do so in good time, a medical brother ought to be invited, in order that his counsel may be taken, and particularly that the friends, and the patient also, may have no doubt left in their minds as to the propriety of the operation, nor claim the least right afterwards to find fault with the physician, should any untoward event follow the plan he had recommended. The act of turning to deliver by the feet is fraught with danger, for there is danger of uterine laceration, or of fatal contusions of the parts of the mother, and of failure to succeed in effecting the version, and great danger of destroying the life of the child in the act of turning. In early times, our ancestors, who did not understand the mechanism of labor, used to wait, after pushing the shoulder back into the body, in hopes the head might descend. For example, here is the doctrine of Thomas Rainald, to be found at fol. lxv. of his "Woman's Booke:" "And yf so be that it appears and comes forth first the shoulders, as in the XI figure, then muste ye fayre and softlye thruste it backe again by the shoulders till suche tyme as the head come forwarde." It may be that those old practitioners of the days of Queen Elizabeth may have sometimes succeeded, by pushing up the presenting shoulder, in getting the head at last to come to the strait again; but such an event appears to me in any case most improbable.

But no operation can be performed while the os uteri is so closed as to refuse admittance to the hand. It cannot and must not be forced. The mouth of the womb must be dilated or dilatable before any operation is lawful; it must be dilated or sufficiently yielding to allow the hand to pass upwards into the uterine cavity; of this degree of dilatability the obstetrician is the only judge. He must never run the risk of tearing or inflaming such an important organ, since its laceration by his hand would be much increased by the following birth of the child, and place the woman in danger of sudden death; or he might contuse the parts so much as to establish a highly dangerous inflammation in them. So important is it to judge aright concerning the *time* to be chosen for the exploration of the womb, that it is thought to be the most responsible duty of the physician in the whole case. If he proceed too soon, the most lamentable consequences are apt to ensue; and if he defer the procedure too long, the difficulties and dangers are greatly enhanced by the delay, while the patient also suffers useless and pernicious pain. The bladder and rectum should be evacuated before the operation. The position should be carefully ascertained; this can be done by the introduction of the hand, if necessary, into the vagina; and if it be certain that the left shoulder presents with the head on the left side of the womb, then he must make choice of that hand which can most conveniently be employed in the operation. The rule is to use that hand whose palm, when open in the cavity of the womb, would look towards the face or breast or belly of the child, which, in this instance, would be the right hand; for it is clear that if the left hand were used, it would not apply the palm to the front of the infant, whether it were carried up before or behind the child's body.

Although some accoucheurs prefer the lateral decubitus, the best position for the patient is that on the back, with the end of the sacrum brought quite over the edge of the bed, the feet and knees being properly supported by assistants, one holding each limb, which should be properly flexed. The woman ought to be carefully covered with a sheet or a light blanket, according to the season of the year, and some thick cloths should be placed on the floor, under the foot of the bed, to receive any discharges of water or blood that might accompany the operation.

Everything being fully prepared, the operator's right arm should be bared to the elbow, and well anointed with lard, while a sufficient quantity of the same material should be applied to the external parts. During a pain, two fingers, and then three, should be passed into the vagina, to be followed by the little finger, and afterwards by the thumb, strongly flexed into the palm. The hand, having gained possession of the vagina, may then rest until the pain is gone off, after which the presenting part must be pushed upwards and leftwards, the fingers and whole hand following the receding shoulder into the cavity of the womb. The shoulder being moved somewhat to the left as it mounts upwards, when the hand is fairly introduced, it ought to be opened and glided along the breast or abdomen towards the feet or knees of the fœtus, which will be looked for towards the right superior posterior portion of the cavity. In searching for the feet, the contractions of the womb are excited, and pains are produced, especially if the waters are much drained off. During these contractions, it is absolutely necessary to open the hand, lest the uterus, from the violence of its own action, might be torn on the knuckles; and the hand ought never to move except the organ be in a state of relaxation. At length, after more or less research, one or both feet, or a knee is found; and, whether it be one or the other, it should be taken hold of; for it is nearly a matter of indifference whether it be one foot or both, or one knee that is used as the point on which to act in turning the child. Dr. Collins, p. 69, remarks, on this point, that "it is quite sufficient to bring down one foot," and I find that Dr. Simpson, of Edinburgh, is of the same opinion—deeming it far more injurious to make persevering attempts at exploration, than to deliver by one foot only. I say nearly a matter of indifference, because, the object being to turn the child as soon as practicable, with proper caution it may be effected in either of these ways; it is always desirable to get the hand out of the uterus as soon as may be, and it is far better to turn by one foot or by a knee, than to incur the risk of laceration or contusions of the organ, by a tedious search after the other foot, which, if it be not originally near its fellow, is very hard to be found by any search for it. The inexperienced student can have little notion of the extreme difficulty there is to move the hand about while it is compressed betwixt the womb and the child; a short experiment of this difficulty would suffice to convince him of the propriety of the foregoing directions. If he should use the knee as a point of traction, it would be very easy, when the version is nearly complete, to draw the foot down. If he use only one foot to turn by, he will have nearly all the proposed advantage of the breech presentation combined with the greater facility enjoyed in manipulating in the footling case—that is to say, he will have the abundant dilatation, and the power of traction by the limb. It sometimes happens that a foot is met with close to the orifice; so that, even without carrying the hand within the uterus, the foot can be hooked down by means of one or two fingers, as has been done by Dr. Robert Lee, of London, and as I also have done.

Having found the foot, if a pain should come on immediately, and prove severe, the foot should be let go, and caught again after the pain is gone off, according to the discretion of the operator. During all the time he is passing his hand up and exploring for the child, either his own unoccupied hand or that of an assistant should be applied to the abdomen, in order, by pressing the womb downwards, to keep the os uteri below the strait; and when he is ready to turn the child, his own hand only should be used by the operator to press on the outside of the abdomen, so as to favor the version by pushing the breech of the child downwards, while he also draws it downwards by the feet or knees. If the hand ought not to move during a pain, it would, *à fortiori*, be the height of rashness to attempt to turn the child with the womb in a state of contraction. The time for turning ought to be chosen as soon as the pain has gone off. Then the womb feels yielding and soft as a wet bladder, and the part held in the hand may be drawn towards the os uteri slowly and gently, but firmly, and, if possible, brought quite into the vagina, or even to the vulva. External pressure with the free hand favors this version very considerably, and ought never to be neglected.

It is easy to ascertain, by external taxis, if the version be complete, and by noticing how far the child is drawn downwards, and judging of its length as compared with the length of the uterus; as well as by noting the effect of the next pain, which propels it if it be turned, but does not move it if it be still transversely fixed in utero.

The Student should remember that the child, from the extremity of the buttock to the crown of the head, is between eleven and twelve inches in length. Hence his hand placed on the abdomen will inform him whether the uterus is of this length or not. If he find the buttock at the os uteri, and the uterus not so long as it should be under the circumstances, he will know that the version is not yet completed, and take his measures accordingly.

Wherever it is possible to make choice of a foot to pull on, we should select that which is nearest the front of the pelvis. In the present case, it would be the left foot, because, in drawing upon that one, the left hip would come under the pubic arch, and favor very decidedly our wish to bring the vertex at last to the pubis, and carry the face to the hollow of the sacrum; whereas, should we draw down upon the right foot, the child's face would, at last, be very sure to come to the pubis.

Under all circumstances, the practitioner is only called upon to do that which he can do, and not that which he would but cannot do; therefore, when he can only find the most unfavorable foot, let him draw by it and meet the consequences.

As soon as the turning is completed, the case has become a footling one, and must be treated as if it were originally so; that is, it should be left to the expulsive powers alone, if they are sufficient, for it is always bad and almost always unnecessary to draw out the body; it should be expelled by the pains. The arms must receive such assistance as they may need; and the head, being properly situated in the vagina, ought to be expelled by the womb with such aid, from slight traction, as the obstetrician may adventure with safety to make.

In going about to perform this operation, the medical attendant ought to reflect upon all the dangers incident to it, and clearly understand, beforehand, that what is most desired in it is, not speed but safety; *festina lente* ought to be the motto. As to the difficulties of it, they are so great, in a womb long drained of its waters and lashed into fury by a long period of unavailing irritation suffered previously to the operation, that nothing but practical experience of them can make them known, unless indeed the fact be understood that it cannot in some instances be effected at all, and that we are obliged to extract the child double, after having removed the thoracic viscera, as well as those of the abdomen, by the crotchet and perforator; upon doing which, the fœtal remains may be drawn forth.

I have, after having had my hand in the womb, found it so completely benumbed by the pressure, as to be unable to feel with it or to close it; in such a case, the other ought to be made use of, however ill adapted either for the exploration or seizing the feet, &c.

The child being delivered, and the placenta taken away, the mother must be drawn up into her bed, so as to enable her to stretch out her feet, and be bandaged and put to bed properly. A grain of opium,

dose of laudanum, containing twenty or forty drops, is very sooth-
and calming after such high excitement and fatigue, and ought
to be withheld from her. A cup of tea or gruel may next be
ented to her, and a short sleep, if she can take it, is followed by
nfortable state for the before exhausted woman.

ıere is very little difficulty in this operation if the waters are not
off; they should, therefore, be always left whole, if possible,
the moment for interference is at hand. Could we, indeed,
ys have the privilege of rupturing the ovum at the time of carry-
he hand into the womb, we should avoid much difficulty, and a
moiety of the danger. Unfortunately, however, turning is rarely
rmined on until the waters are lost, and then the danger is neces-
y greater.

ıere are many ignorant persons, who are generally the more
umptuous the more they lack knowledge, into whose hands
en are so unhappy as to fall on the occasion of their childbirth.
a shoulder presentation, the hand happens to prolapse, they,
ng a very convenient handle, make use of it to pull the child
by, and I have seen a case in which an unfortunate woman had
so treated; the arm was wholly withdrawn, and the acromion
ess of the scapula was actually under the pubic arch, so violent
the tractions that had been made on the hand and arm. This
done, too, with a rigid os uteri, which, after yielding a reluctant
ge for the arm and point of the shoulder, was now grasping the
above it with a strength like that of a rope, and which afterwards
ted for a long time all attempts to pass the hand along betwixt
rcle and the child. To one unaccustomed to the incidents of the
-in chamber, it would be, perhaps, vain to attempt to convey an
of the resistance sometimes met with in the circle of the os uteri.
ollins, in speaking of one of his cases in the Dublin Hospital,
at p. 67: "The mouth of the womb was absolutely as firm as a
of thick leather, and embraced the arm of the child as tightly
ligature could be applied without cutting the part."

ıere cannot happen anything but evil from pulling at the hand
arm. Such force cannot pull down the child, which is too
to pass doubled. The arm is not in the way; for the hand
practitioner and the arm of a fœtus at term can never equal in
a circle sufficiently large for the head to pass through it. The
of space is not in the faulty construction of the pelvis, but in the
constriction of the os uteri and vagina, which, if too rigid to
it the hand, is also too much so to allow the child to escape.
rigidity can be overcome. It cannot be needful to excise the

arm, or twist it off at the shoulder-joint, a horrid practice, which seems to have received a salutary check from a judicial investigation that was had a few years since in France: a practitioner there, finding it impossible for *him* to deliver in an arm presentation, cut it off at the shoulder-joint, and nevertheless the child was born alive. The obstetrician was justly prosecuted on a charge for maiming.

If an os uteri will not admit the hand of the accoucheur, it is because it is not dilated or dilatable. Let the proper measures, then, for effecting the requisite change in the uterine tension be resorted to. These are bleeding, the warm bath, antimonials, emollient enemata, followed by enemata of laudanum; and patience, though last, is not the least of the resources for such an occasion. Women in labor bear venesection remarkably well; and they demand, in some instances, very plentiful bleeding in order to get the full benefit of the remedy. A patient bled ad deliquium animi will be more capable of undergoing safely the operation of turning than one left to the unmitigated provocations and stimulus of useless labor pains.

It will have been seen that, in a preceding page, I have strongly expressed my dissent as to the anæsthetic practice in Midwifery. If there could be a case to render a complete anæsthesia by ether or chloroform a desirable condition for the patient and the practitioner, this is the case *par excellence;* certainly, a complete anæsthesia might have the effect to abolish the voluntary power of the mother, and, thus taking away the injurious force of the abdominal muscles and diaphragm, leave her to the sole influences of the uterine powers, which are not wholly annulled even by the deepest anæsthetic insensibility. Professor Simpson and other distinguished gentlemen warmly advocate the induction of anæsthesia in these cases; let the Student give heed to the opinions of these meritorious men, but let him be the sole judge of his own duty in any and in every case.

The warm bath is a safe and easy remedy for the obstinate constriction of the orifice, as it is for all spasms and other congenerous disorders. Tartar emetic, in doses of the eighth or sixteenth part of a grain, repeated every thirty or forty minutes, conduces very powerfully to the reduction of the spasm or rigidity, and may be very safely resorted to in the management of our case. Much reliance is also to be placed on the power of the belladonna ointment applied to the cervix uteri, in which it often most speedily induces a complete local anæsthesia. Copious enemata of infusion of flaxseed, with a portion of castor oil to render it somewhat more aperient, should be had recourse to, and they may be followed by anodyne enemata, composed of an ounce of flaxseed tea or starch, with from fifty to eighty

undred drops of laudanum. We should also not forget that
ought to work her perfect work, and no more; the accoucheur
the sole judge of how far patience ought to go.

ld think that there can never be the least use in attempting
n the arm. The arm must be returned by the version of
l: it goes upwards into the womb as the head rises and the
escends. It would always be prudent to secure it by a noose,
urpose of preventing its going too high within the cavity,
s presence might cause some embarrassment in the delivery of

sgreave, Esq., in the *Lancet* of 1828-9, p. 298, informs us
has at no time lost a child in an arm presentation. His
is to push up the arm during the absence of the pain, and
into the womb and hold it there; after which the spontaneous
n takes place, and the infant is born by the spontaneous
f the womb. Mr. C. must certainly be regarded as a very
ractitioner, to have met only with cases in which he could
he arm to the cavity in this way, or in other words turn
l without searching for the feet. I am not aware of the
of his cases. I cannot, therefore, judge of the comparative

persons have imagined that in the conduct of some of these
cases of shoulder presentation, great facility in delivering the
s obtained by amputating the arm, or wrenching or twisting
sheer brute force. Indeed, I am aware of an instance in which
r tore off in utero the arm of a child which was afterwards
re, with the end of the humerus projecting below the ragged
edges of the wound. The arm was hidden, but afterwards
d. The people interested, were made to believe that the lost
been destroyed by absorption.

course of proceeding is to the last degree unjustifiable. Un-
e before the outraged family, and equally so as bringing un-
discredit upon the whole profession of physic. If in any case
leemed necessary to remove the prolapsed arm, it ought not
ne without any antecedent announcement of the purpose, and
res. For my own part, I cannot understand what are the
that should leave an accoucheur to do so barbarous an act.
xtirpation cannot be deemed needful to provide space within
since the arm of a fœtus can never fill up a pelvis so as to
the introduction of the accoucheur's hand for exploration and
Whenever it is done, it is done with a e space
ft parts, but those soft parts will dilate in under

wise treatment. My clear opinion is that the amputation of the arm in shoulder presentations is a mala-praxis, and that it ought to be discountenanced and protested against.

Spontaneous Evolution of the Fœtus.—It has happened that the operator, being unable to turn the child, has abandoned any further and useless attempts to deliver. In such instances, the woman has sometimes delivered herself by what is called spontaneous evolution of the fœtus.

It is very important for the Student to understand clearly what is meant by spontaneous evolution of the child; and it will not be difficult for him to do so, if he will bear in mind the facts: 1st, that there is a superior strait; and, 2d, that the child's head and its body cannot be within the plane of that strait at the same time.

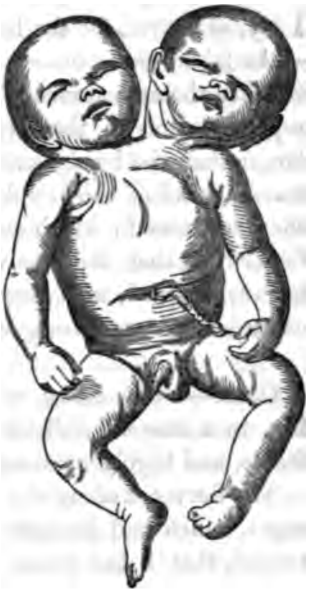
Now when the shoulder is presenting, and the arm, fallen down, allows the shoulder to be thrust or drawn quite out underneath the triangular ligament of the pubis, it happens that the side of the child's neck lies against the inner aspect of the symphysis of the pubis. But, if the side of the neck is pressed against the wall of the symphysis, the head of the child will lie upon, and even project over and beyond the horizontal part of the pubal bone, making a hard orbicular tumor that may be felt there with a hand laid on the hypogaster.

Now, things being situated as above, let the Student conceive that the trunk of the child's body, still contained in the womb, is thrust by the continued contractions more and more downwards, the head still resting upon or above the brim. The effect of this downward thrusting force will be to push the shoulder farther and farther out beyond the crown of the arch, and the head more and more over the top of the bone, leaving a space in which to thrust the trunk of the child. If it be a left shoulder case in the second position, the third rib will come out at the vulva, then the fourth, fifth, sixth, seventh, and so on until all the left side of the thorax is pushed out; after which follow the left flank, the left ischium, and trochanter; upon the escape of which the left thigh and leg are delivered, followed immediately by the right thigh and leg, then the right arm, whereupon nothing remains but the head, which is speedily born.

Such is a spontaneous evolution. It differs from Version or Turning in this—that in turning, the head goes up to the fundus, while the buttock comes into the passage. Here the head is held close to the plane of the strait by the shoulder which has got under the arch, and even projects beyond it, so that the head is, as it were, tied fast to the brim so that it cannot rise.

Here I repeat the figure of the double-headed fœtus, which I already have given at page 223, Fig. 63. Let the Student see in this figure a case in which evolution was indispensable. For example, suppose the right head to have presented, and to be delivered. That head would be held close to the vulva, outside by the left head and body—the left head and body could not possibly be in the plane of the strait at the same time. It would be impossible to deliver by Turning—for the delivered head ties the undelivered one to the plane of the superior strait. Of course, then, it only remains that the undelivered head shall be forced over the horizontal ramus of the pubis to allow the trunk to descend by evolution, as I have described that process in the shoulder case. As soon as the trunk is born, the remaining head may be brought away.

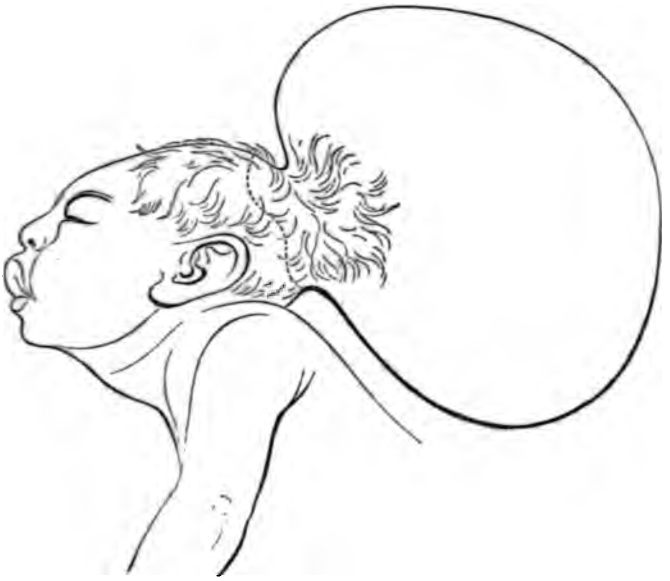
Fig. 89.



Dr. Pfeiffer, who showed me the specimen, delivered the woman, as I found upon inquiry, by compelling the evolution of the body of the fœtus.

Here is a repetition of the figure of Dr. Rohrer's case, given at p.

Fig. 90.



225. Let the Student observe that such a vast fluctuating tumor on the vertex of the child could never be the really presenting part; that it must necessarily deviate, and go up in the iliac fossa, allowing the true head to present, and making that, of course, a face presentation. I say, of course, for the head would be of course in extension. Well —the labor going on—the head is born in face presentation—giving the face the appearance of suggillation—of which I have made a good representation in the figure; but the head being born, the tumor, larger than the head, remains above the strait, in the same way as the second head of the double-headed fœtus of Dr. Pfeiffer's did. Here, then, is a case in which evolution is indispensable, and Dr. Rohrer informed me that this was what he brought about—after doing which he was enabled, with very violent force of traction, to pull away the caput succedaneum—as you see it in the figure.

Case.—I was called, some time since, by a friend of mine to assist him in a case of difficult and alarming labor. The woman, small, feeble, and highly nervous, was the mother of several children.

The doctor, finding the labor very slow, had administered a dose of ergot, which had brought on a most violent ergotism; to that degree, indeed, that I had great reason to fear she might speedily die from the mere excess of pain and irritation, if not from laceration of the womb, which appeared to me imminent. I have rarely witnessed a wilder expression of agony than hers.

I found the left shoulder down, in the second position. The indication was to turn and deliver by the feet—which I was requested to attempt. Protesting beforehand that I deemed success impossible, I reluctantly consented to make an attempt. With great difficulty I passed my right hand through the os uteri; but it was completely pinioned and held fast and immovable by the muscular contraction, and I was but too happy to extract it without having caused a laceration of the cervix. The waters had long gone off. The child was dead. I concluded it was impossible to turn, and I felt equally convinced that she would die before evolution could take place spontaneously.

I opened the thorax at the axilla, and broke up the tissues within both pleural cavities. Then, by means of the crotchet, I drew down rib after rib, the flank, the hip, and the buttock, so that I got the left thigh and leg down; then the other extremity, which completed the evolution. The arms came down, and I delivered the head. The woman recovered happily.

I relate the case, in order that the Student, reading it, may have a clearer idea of what is meant by evolution in contradistinction to turning of the child.

Hemorrhagic Labor.—Labors are also rendered preternatural by the occurrence of hemorrhage from the womb; for, although it is very common, and not unfavorable for the parturient woman to have an issue of blood during some part of the process of childbirth, it is not either safe or natural for her to lose so much blood as to give to the flow the character or title of hemorrhagic. In general, the quantity lost antecedently to the birth of the child does not exceed an ounce, and it is commonly even less than that. The occurrence, therefore, of a show of blood need not, and does not excite any alarm or even surprise, unless it goes beyond the ordinary amount. But where the effusion becomes excessive, great alarm is felt, and there is more or less real danger according to the cause of the hemorrhage.

I have already expressed my opinion of the mode of connection between the placenta and the womb; and the Student will have seen that I do not admit that any very large vessels pass from each to the other, interchangeably. Hence, when blood escapes from the uterus, it may be, perhaps, in consequence of a hemorrhagic nisus or sanguine determination, like that which sometimes causes the effusion of blood from the Schneiderian membrane, in those cases of epistaxis that come on spontaneously, or in the floodings of ordinary pure menorrhagia. We often see very copious outpourings of blood in epistaxis, where we can have no reason to suspect any rupture of vessels or solution of continuity in the membrane. The same thing takes place in the pulmonary hemorrhage, and in hæmatemesis. But as the womb, from its very constitution, is prone to the hemorrhagic affection, it is more liable than any of the organs to losses of blood, without the suspicion of rupture of its tissues. Nevertheless, there is reason for believing that, in some cases of profuse bleeding, the delicate tissue of the uterine veins has been ruptured.

The gravid womb, a *vacuum plenum*, is *filled* with the ovum, which is really connected with the containing organ only at the placental superficies. All other points of the ovum, except the placental portion thereof, adhere so slightly as to be capable of most easy detachment. The placenta itself may commonly be separated with great facility from the surface on which it sits. When the chorion is detached from the womb, very little or even no blood escapes; but when the placenta is torn off, the womb generally, not always, bleeds freely. The separation leaves exposed many patulous openings that lead directly into the large veins and sinuses of the uterus. Hence, large effusions of blood, in labor, indicate that the placental surface of the womb is exposed by the separation of the after-birth from it.

If the after-birth is torn off, or in any manner separated from its place, the womb still remaining undiminished in size, it is evident that the blood may continue to flow for an indefinite period, and that the woman may be brought into great danger thereby—for the bleeding orifices may, for an indefinite term, continue to have the same degree of aperture as that which first allowed them to bleed. Supposing the superficial content of the gravid uterus to be two hundred inches, and that of the non-gravid womb to be only three inches, then it is evident that the great desideratum in uterine hemorrhages, before delivery, is to empty the organ as soon as practicable, in order to reduce its superficial content, as nearly as may be, to the smallest number of square inches, or the non-gravid superficies. In treating cases of alarming hemorrhage, therefore, we should ever keep in view the fact that, if the womb be allowed to contract or condense itself, its own muscular fibres will, by their contraction, lessen the calibre of all the bloodvessels that are distributed on or in the organ, and in proportion to this condensation or contraction will be the certainty of arresting the sanguine effusion. It is not the orifice only that is closed, but the whole *tractus* of the vessel that is constringed.

If a labor should commence ever so favorably, with the child presenting the vertex in the first position, and the pains should propel the child downwards, so as to give reason to think the process about to terminate in the most happy manner, it might yet happen that hemorrhage should commence, and continue so abundantly as to make it absolutely necessary to deliver the child, in order to let the womb contract perfectly. This delivery by artificial means converts the labor, which commenced naturally, into a preternatural one. We should hardly be inclined to call that a preternatural labor which, though accompanied with a great effusion of blood, should terminate well, without any assistance on the part of the accoucheur.

There may also be a very copious and dangerous effusion of blood between the time of the birth of the child, and the delivery of the after-birth; and even after the after-birth has been discharged, the flow of blood may be so considerable as to involve the woman in the greatest danger. In the management of all these kinds of bleeding the same indication is to be kept always in view; to wit, the condensation or contraction of the womb; for when that organ is fully contracted and condensed, the blood cannot flow so abundantly as to endanger the patient, except in some very rare, and almost unheard of cases.

But among the causes of uterine hemorrhage, there is one which has been called the unavoidable cause, and is, perhaps, the most dangerous and difficult to manage: I mean that case which depends on the situation of the placenta happening to be on the cervix and os uteri. This is essentially a hemorrhagic labor, inasmuch as the conoidal cervix of the womb must not only dilate, but must dilate completely into a cylindrical form, in order to admit of afterwards carrying out the great object, the final condensation of the womb. Such a hemorrhage begins very moderately, but as larger and larger portions of the placenta continue to be detached with every successive dilating pain, it follows that the nearer the womb is to its complete dilatation, the more profuse and dangerous will be the hemorrhage.

Every considerable effusion of blood in labor does not demand the manual or instrumental assistance of the accoucheur. A woman may shed a quart of blood, and yet the pains may suffice to expel the fœtus in a natural way, after which the flow ceases. It is the effect, or the probable effect, of the bleeding, that renders it needful to interfere. If the pulse begins to grow small and frequent, the patient becoming weaker, the countenance paler, and the pains less energetic, we have to resolve what course we must take, and then resort to some of the numerous expedients for checking the discharge.

If the pulse in uterine hemorrhage be full and throbbing, and the constitution not as yet affected with debility, we may, with great safety and propriety, have recourse to a bleeding from the arm in order to lessen the momentum of the blood, which, by its too great impetuosity, tends to keep up the flow and the determination to the womb—just as we would bleed in a pleurisy or hæmoptoe, with a similar view. Such a course, however, would be very strongly contraindicated in the case of a feeble pulse, and a general state of weakness, faintness, or sinking, where, indeed, there would be no reasonable ground to hope for relief by the use of venesection.

The application of cold to the hypogastric region is often found to have a good effect in checking the sanguine effusion, and should be freely resorted to by stuping the lower belly with napkins, hard wrung out of cold vinegar and water; the application being renewed from time to time, until we are satisfied that success is, or is not, to reward our efforts. During the employment of the above-mentioned means, the patient ought to be placed in a horizontal posture, with the head very low, and the body covered only with sufficient bedclothes to keep her comfortable; the apartment should be freely ventilated, and the patient allowed to take any reasonable quantity of iced water, or lemonade, while, at the same time, she makes use of the infusum rosæ rubræ with elixir of vitriol, or the plumbi acetas with opium.

Such are the general means for repressing the sanguine movement towards the womb; but these means do not suffice always, and we ought to examine by the Touch, in order to make sure, if possible, of the cause of the hemorrhage. If, upon inserting the finger within the os uteri, no portion of the placenta can be felt, and the membranes are found to be unbroken, we may, perhaps, resolve to rupture the ovum, with a view to diminish the size of the womb by letting its waters run off. If a quart of water should escape from the organ immediately after the breaking of the membranes, the superficies of the womb, and of course the placental superficies, would be sensibly lessened, since the organ contracts as soon as the escape of the waters permits it to do so. This is the method proposed by Louise Bourgeois, a female practitioner in France, many years ago, and it is found to answer perfectly well, in many cases. Louise says, "The bag of waters being as yet not formed, we must break open the membranes that enclose the child, just as we would break open a door to save a house on fire, and draw forth the child by the feet; for this is the way to save the mother's life, and give the child a chance to receive the rite of baptism."—*Obs. Diverses*, &c. &c., 1627, 12°, Paris, p. 65.

There are circumstances, however, that might well induce one to defer to the latest period the breaking of the ovum; such as a known bad presentation of the child, requiring it to be turned. In such a case, no prudent person would be willing, without an absolute necessity, to permit the water to escape from the womb previous to dilatation, since the operation of turning is vastly more difficult, when performed in a female from whom the waters have been quite evacuated, than in one in whom they are still present. Hence, if the mouth of the womb be still very rigid and undilatable, rendering it impossible or improper to introduce the hand for turning, any prudent person would give a very deep consideration to the question, whether the membranes ought to be now broken or not; he would certainly feel inclined to defer, till it should become unavoidable, the rupture of the membranes. Louise goes on to say, "Je n'entend pas que, si tost qu'une femme a une perte de sang, que l'on y procede de cette façon là, mais il faut veiller sur elle comme le chat la souris, et faire la guerre au doigt et à l'œil"—p. 67.

"I do not pretend to say that, as soon as ever a woman is seized with a flooding, we are to proceed after this fashion; but that we must watch her as a cat watches a mouse, and carry on the war by seeing and by feeling."

If, upon rupturing the ovum, the flow of blood should not be stayed, and the os uteri should still continue to be so rigidly contracted as to make it impossible to turn the child, recourse should be had to ergot, in small doses, with a view of producing a feeble ergotism, or tonic contraction of the womb—not severe enough to injure the child, but yet so strong as to condense the uterine tissue sufficiently to arrest the flow of blood from its vessels. With this purpose, five grains of the secale cornutum, in powder, ought to be administered every half hour, or every hour, according to the pressing nature of the demand for its aid; or a teaspoonful of the vinous tincture of the same article might be exhibited, at proper intervals, with the same view.

There is, in general, under these circumstances, a strong disposition among practitioners to make use of mechanical means of stopping the hemorrhage, such as the application of napkins to the vulva, strongly compressing the orifice; and also the plug or tampon, which, filling the vagina, is supposed to favor the coagulation of the blood. But, if it be remembered that the bleeding orifices of the placental superficies on the womb are—except in placentia prævia—near the fundus uteri, and that the extravasated fluid trickles down, betwixt the chorion and the womb, from the fundus to the orifice, I think it will be seen that such mechanical means can scarcely exert any other than injurious effects in the case. They may enable us to conceal the fact both from the patient and from ourselves, that the vital fluid is escaping in a dangerous abundance; but common sense ought to show us that, while we may prevent the fluid from falling out of the orifice of the vagina, by plugging that orifice with sponge or other materials, we do not prevent it from flowing back upon the outer surface of the ovum and the placenta, both of which it detaches more and more completely from the womb, leaving the woman exposed to greater hazard than she would incur were we to permit the blood to escape as fast as it is effused. Such methods, assuredly, will not favor the arrest of the effusion by coagulation; the source of the flow being too distant from the compress. It is better, in uterine hemorrhage near term, to let all the blood that escapes from the vessels also escape from the vagina. When the uterine superficies is diminished, the bleeding is stayed. The application of cloths, wrung out of iced vinegar and water, to the hypogastrium, is of greater avail, and far more safe than the tampon. I would gladly urge upon the Student the necessity of the greatest caution in the employment of so dangerous an agent as the tampon, except in the early stages of gestation, or where the capacity of the womb is not sufficiently large to admit of its containing a great quantity of blood. No hemorrhage is so dangerous as the concealed hemorrhage.

Whenever, in a hemorrhagic labor, it is clearly ascertained that the period has arrived for the delivery to be hastened, which is known by the state of the patient's strength, the pulse, the color of her lips and cheeks, and by the dilatation or dilatability of the mouth of the womb, preparation should be made for the operation by placing the woman at the foot of the bed, as in the case before mentioned. The choice of means, whether it is to be of the hand or the forceps, will turn on the degree of advancement of the head, which is readily seized by the forceps, if low in the pelvis, but which is to be pushed away to make room for the search after the feet, provided it be still within or above the brim of the pelvis. In all cases wherein the vertex is to the left side of the antero-posterior diameter of the pelvis, the left hand is to be used; while the right hand is adapted for turning, in all examples of labor where the vertex is to the right half of the pelvis. The operation differs, in no respect, from the one already described, except that the head instead of the shoulder must be pushed out of the way. If the head should have already occupied the upper strait, that strait would be nearly filled with the mass; the hand could not be carried up alongside of it. The palm of the hand, therefore, being placed underneath the head, would push it gently upwards, in the absence of pain, and carrying it to one side, it would be retained on the brim, by the wrist or arm of the physician, which occupies the space recently in possession of the head, while the exploration or search for the feet would be then conducted as in the case already treated.

When I come to speak of the use of the forceps, I shall say what is requisite concerning the indications and manner of its use in the hemorrhagic affections; wherefore, it seems by no means needful for me to anticipate here, what I shall feel obliged to say in a future page of this book.

Placenta Prævia.—The unfortunate location of the placenta on the cervix and os uteri is an accident which does not very frequently happen, and which, when it does occur, can scarcely ever fail to produce much anxiety and alarm among all those who understand the case, and feel any interest whatever in the mother and her offspring. The after-birth may cover the os uteri so exactly, that the very centre of the placenta may correspond to the orifice. The danger is enhanced by as much as the location is more central; that case being the least dangerous in which the edge of the placenta is nearest to the os uteri.

occurrence will not probably be discovered until about the th month, a term of gestation at which the cervical portion of omb begins more considerably and rapidly to expand, in order come a part of the general containing cavity for the ovum r; and it is in some rare instances not discovered, nor even cted to exist, until the labor at full term comes on. In a ity of cases, it happens that as soon as (in the seventh month) the begins to stretch, or give way, parts of the placenta are broken detached from the surface of the womb, and a more or less t flow of blood ensues, but stops as soon as the patient lies , or makes use of a venesection or some cooling drinks. The having been concluded, it is thought to have depended upon strain or shock, &c. &c., and the patient having recovered, goes her usual occupations. I have met in practice with examples, ich the first gush of blood was very copious, and I have even the very first gush take away the pulses at the wrist and over- d the whole surface with a death-like and most ghastly pallor. not difficult to understand that such a sudden and copious ation of the vessels is capable, in a weakly woman, of extin- ing her life in a few minutes. If in such a death-like deliquium ricle and ventricle should be filled with blood suddenly coagu- within the cavity, animation could not be restored.

ppily, however, a first hemorrhage is rarely fatal; the woman ers from the immediate effects, and supposes it a mere accident ring no great precautions. In a short time, a further expansion cervix detaches a fresh portion, and the exposed womb bleeds . These attacks of bleeding are renewed again and again, with l intervals, until, by their violence or the weakness they produce, an alarm is taken, that an examination per vaginam is proposed, ceded to, when the cause of so much bleeding is discovered in ct of the untoward location of the after-birth. It does not iably happen that the woman bleeds previously to the attack of pains, but such occurrence is far too general, not to cause the r of these frequent repetitions to be kept before our eyes, until atient is finally delivered. The loss of blood by repeated attacks, g the last two months or six weeks of gestation, renders the sub- f them far less capable of bearing the frightful effusion with she is menaced for the day of her parturition. A woman hould go into labor with a good stock of strength, could bear, ut injury, a very copious draught on the sanguine mass, whilst er one, with vessels already drained, should sink from the further ation of a few ounces. I saw, about two years ago, a woman drained nearly to the last drop that could be spared, in a labor that had been preceded by many attacks of bleeding from a placenta prævia.

Hemorrhage arising from the presence of the placenta at the os uteri, called placenta prævia, is also denominated unavoidable hemorrhage. The case should be always suspected to exist when pregnant women are attacked with hemorrhage between the seventh month and Term: and the existence of it should be verified or disproved, in all such cases, by an examination. If it be found to exist, then the friends of the patient, but not the patient herself, ought to be notified of the nature of her position; full instructions ought to be given for the management of any future attacks in the physician's absence; and the services of another medical practitioner should be retained for all sudden emergencies, during the absence of the regular attendant. By such attentions as these, the patient might confidently expect to secure the services of at least one medical man, should her own regular physician happen to be engaged when her time of suffering arrives.

When the placenta is *prævia*, it will be almost certain to produce a bleeding before labor comes on, as I have above intimated; nor is the first flooding, or even the second or third, very apt to usher in the pains or contraction of labor. Such bleeding will be far more likely to occur in a woman who exposes herself to fatigue and various causes of excitement, or to accidents, than in one who keeps herself quiet, carefully avoiding to make any great exertion, or experience any violent emotions of the mind. In all cases of a strong predisposition to bleeding, an increased momentum of the blood augments the predisposition. Hence, cooling diet, gentle aperients, small venesections, and repose, and relaxation of occupation especially, ought to be very carefully prescribed for our patient. The friends should be enjoined to give us the earliest notice of the attack of labor pains, or flooding, or faintness, so that, all preparations being complete, we may have nothing to embarrass us in the exercise of our judgment, during the actual progress of the labor. I should esteem it a sacred obligation resting on the physician, to take precautionary measures in all instances where placenta prævia is ascertained to exist before the onset of labor. To know that a woman is exposed to the greatest danger, and yet to omit warning her friends or herself, would be unpardonable. Women sometimes die in this way very suddenly, and such hazards ought to render us extremely watchful over them. It is true that we have cases of placenta prævia unattended by notable hemorrhage. Indeed it is easy to understand, that a woman so situated might be rapidly delivered by the spontaneous power of parturition. In such cases, the placenta is rapidly displaced, and suddenly thrust forth before the head of the child. Such a labor, lasting not more than ten minutes, could scarcely prove fatal, or even exhausting, to the woman. Viardel's case, in which he turned and delivered by the feet (*vide* Viardel, p. 87), seems not to have weakened the patient very much.

The degree of hazard of perishing to which the patient is exposed depends on the dilatability of the os uteri, and the strength of the pains to be employed in dilating it: if it be soft, and the pains strong and good, the dilatation may be completed so rapidly, as to prevent the effusion of any very great quantity of blood. If, on the contrary, it be rigid, and yield very slowly to the feeble contractions of the fundus, the loss of blood may be very great, and the woman may sink before the mouth of the womb becomes prepared for the introduction of the hand. It must be prepared before the hand can be introduced. There is no more important doctrine, in operative midwifery, than that which avers that we must never presume to force the uterus, until dilatation or dilatability abstracts from the operation of turning one of its most objectionable characters. Dr. Collins, in his late work, speaks so sensibly upon this subject, that I shall not refrain from quoting the following passage from page 93 of his book:—

"I know of no circumstance *so much to be dreaded* as the forcible introduction of the hand where the parts are in a rigid or unyielding state; for, although turning the child is the established and most desirable practice, yet the success of this operation will mainly depend on the judgment of the practitioner in selecting the most proper and favorable time. Cases will happen where he is obliged either to suffer his patient to sink from loss of blood, or proceed to deliver when the parts are in an undilated and rigid state, in order to afford her the only chance of life; but dire necessity should alone compel him to hazard the consequences of such violence." Such is the language of an eminent author, who has witnessed a vast number of labors, and whose ample experience gives him a title to speak as of authority upon this and all other subjects connected with Midwifery.

The time for delivery having arrived, the woman, if sufficiently strong to bear it, should be brought to the edge of the bed, and placed on her back; otherwise, she should not be moved, but attended to as she lies upon the left side. If the head present, and the position be unknown, we ought to infer that the vertex is to the left acetabulum, which is the most common one, and of course commence the operation with the left hand. The palm of the left hand easily applies itself to the face, breast, and abdomen of the child lying in the first vertex position—and of course that is the hand most conveniently applicable to the operation of turning.

In some instances, as when the patient is not very fat, we may detect the position by external exploration, for we may trace the curve of the spine of the child from the buttock to the head with our hands applied to the belly of the parturient patient during the absence of the pains, and the orbicular head is generally to be distinguished through the lower belly by its form and hardness. In April, 1850, I ascertained, in this way, a head presentation with the vertex to the right ischium, and so used the right hand to turn and deliver, which I found to be correct, as I easily caught the child's knee in the left side of the womb.—It is very desirable, in this operation, to use that hand first with which the whole operation is to be effected—and not introduce it and take it away in order to introduce the proper one.—Time and blood are both liable to irreparable waste by such manœuvres. If we happen to select the wrong hand to detach the placenta, and find ourselves under the necessity of withdrawing it and substituting the other, a great many ounces may be lost in consequence; but it is our duty to save all that it is possible to save. By means of the fingers, we soon learn which side of the uterus is detached from the placenta, and then conduct the fingers in that direction, dilating the womb as we proceed, and carrying the fingers as far upwards as we conveniently can, betwixt the womb and the chorion. The membranes may then be ruptured high up in the uterus, and the feet immediately sought for; the child should be turned as speedily as possible, with proper regard to its safety and that of the mother; and the legs, and even the thighs, should be drawn into the vagina, not only with the view of expediting the delivery, so as to permit the womb to contract, but also in order that the thighs or body of the child being come into the cervix, may, by compressing the bleeding parts there, arrest or impede the flow, and thus save for the patient as many ounces of blood as possible. It is to be remembered that it is the loss of the last half pint of blood that kills the patient. I think that no prudent person would undertake to pierce the placenta, in order to get the hand within the womb. There never can be so much difficulty in detaching, as there would be in piercing the organ; and these two objections lie against perforating it: namely, that the rupture or laceration of its vessels could not but be destructive to the child, which would bleed to death; and also, that if the feet should be dragged through a perforation made in the placenta, the final delivery of the body and head might be very much retarded, by having that mass to pass through, in addition to the other obstacles to the birth; and further, it is evident that, in perforating the placenta and extracting the child through its centre, the organ could scarcely fail to be completely detached from the womb, while only a partial detachment is required if it be made on one side. It is best, therefore, in all cases, to pass the hand betwixt the placenta and the womb, and not through the placenta: one could hardly expect to find the whole circumference of the placenta still adhering to the womb in any case where the dilatation is considerable. Some segment of its margin must early have left its seat on the uterus.

A strong desire to reinforce the tonic contractility of the womb would induce me, always, to exhibit a portion of the secale cornutum, in these cases, taking care to time the dose so as to secure its operation for a period subsequent to the delivery of the child. The ergot should be in readiness, and given as soon as the turning is completed. If it should operate successfully upon the uterine muscular fibres, it could not but afford additional hope of preserving the patient, at least, from the danger of a good deal of drainage, if not from a more violent and rapid effusion subsequently to the delivery. So confident am I in the power of the ergot administered in this way, that I venture to recommend it very strongly. Many persons, who were constitutionally prone to hemorrhage after delivery, have escaped well, from having taken the spurred rye in the last moment of labor, in order to secure a tonic action of the uterus after delivery of the child.

I need not reiterate my opinion that the operator should never be unprovided with the forceps, with which to extract the head, in case of any uncommon or dangerous delay in its delivery, as I have already stated my opinion that such means of security ought to be provided for every instance of breech labor, or preternatural presentation, of whatever species.

Fortunately for us, we do not have to contend with a great many cases of placenta prævia. I have seen eight cases of these accidents, in which the orifice was completely covered by the after-birth, and several others in which the edge of the placenta was located on the cervical portion of the womb, and occasioned a certain degree of hemorrhage, during the dilatation, but not to any dangerous or very alarming extent.

Dr. Collins mentions that eleven cases occurred during his mastership of the lying-in hospital, equal to one case in one thousand three hundred and ten labors, since he had sixteen thousand four hundred and fourteen labors during his mastership.

It is rather a surprising circumstance that Mauriceau, who was so largely engaged in midwifery practice, and who witnessed a good many cases of placenta prævia, should have been supposed to be ignorant that the original attachment of the after-birth was on the cervix. It has been asserted that this distinguished writer always supposed that, when the placenta was before the child, it was owing to an accidental detachment of it from the fundus, and that it had afterwards fallen down to the orifice, so as to get in advance of the presenting part; and yet, he very distinctly gives directions how to pass the hand, so as in the easiest way to get it by the placenta, when the operation of turning has to be performed; and the twenty-eighth chapter of his second book is devoted to a very full account of the mode of delivery in such cases—and he gives at full length the description of twelve cases of placenta prævia most admirably managed by himself, which are in the first volume. The celebrated Levret gives us, in his article on placental presentations, an elaborate *résumé* of the history of opinions on that accident as expressed by writers antecedent to him. It seems that many practitioners had treated the case, and well, too, but without possessing such correct notions upon it as are entertained at the present time.

It will have been perceived that I have not, in this article on placenta prævia, adverted to the new method of treatment which has been so strongly advocated by Drs. Simpson, Radford, and other eminent persons among the brethren in England and in this country. I mean, the total separation of the placenta, by the hand of the accoucheur, as a certain method of putting a stop to the effusion of the blood. The journals and other publications, in which this treatment has been set forth and recommended, contain the relations of numerous cases in which the placenta was either accidentally or designedly separated from its place on the womb, and in which the blood ceased to flow immediately after the complete detachment of the after-birth. Notwithstanding the good success of this practice has begun to render it very popular, I think that too much confidence is reposed in its power to arrest this most dangerous flooding, and I attribute its success so far rather to the well-known power of nature to cure the cases than to the method or the dexterity of the friends and promoters of it. It has been supposed heretofore that alarming uterine hemorrhages proceed from patulous orifices of vessels of the womb, and that the essential remedy for these effusions consists in the condensation of the uterine texture under the active contractility of its muscular fibres. But the advocates of the new practice in placenta prævia explain their success and urge the adoption of their method upon the new ground that the blood flows, not from the uncovered portion of the uterine placental superficies, but from the uncovered surface of the placenta itself, averring that while a part of the placenta is detached and the rest of it retains its adherence to the uterine surface, the blood of the uterus continues to pass into the cells of the still attached placenta, from whence it escapes into the cells of the detached portion, and thence issues in torrents from its free surface; whence the idea that, by wholly separating the placenta from the womb, no more blood can gain admission to the cells of that tissue, and therefore no more blood can be lost. I regret to see that this unphilosophical and anti-physiological view still has its advocates—as for example in a discussion on Dr. Barnes' paper in the Medical Society of London, Dec. 22d, 1848, reported in *Lancet*, No. 1, vol. i. 1856, p. 14. Dr. Barnes advises that part of the circumference should be detached, to obviate the traction of the rest, and Prof. Murphey, in his remarks, insists that the flooding proceeds from the womb through placental vessels. I hope a sounder physiology may soon remove so erroneous an impression, and set aside so evil a practice.

Entertaining those views, which I have already, at page 202, expressed, as to the constitution of the placenta, and its connection with the uterus, and to which I beg the Student to refer, it is clearly impossible for me to admit the truth of the foregoing explanation of the hemorrhage of placenta prævia.

To say that the detachment of the placenta, without any consequent reduction of the superficial contents of the uterus, could arrest a hemorrhage by breaking off the curling arteries (as they are called) of the womb, appears too quite unphilosophical, for there are thousands of facts of ante-partum and post-partum hemorrhages to prove that the arrest of hemorrhage is the consequence of condensations of the womb under its muscular contraction.

The incision of the womb, in a Cæsarean operation, often cuts through the most vascular part of the organ, and as the bistoury sinks into the tissues, the blood spirts from numerous divided vessels; but as soon as the child and the secundines are taken out of its cavity, and the organ is allowed to contract, the immense orifices are nullified by the condensation of the texture, a cut of five inches in length being immediately reduced to a length of not more than two or two and a half inches, and its incised edges scarcely allowing of the smallest sanguine exudation.

This I have observed to happen in the instance of Mrs. Raybold, whose case is related in this work. To separate the placenta, and not allow the womb to contract, is to gain nothing; for the hemorrhagic molimen, or the mere traumatic flow, cannot be supposed to cease merely because the curling arteries (so called) are broken off.

Further, in placenta prævia the effusion is, in many instances, most dreadful, long before the hand of the accoucheur can be passed upwards, in order to turn and deliver. Nay, it is alarmingly great in some samples, while the os uteri is still not larger than a quarter of a dollar. But as the placenta is eight inches in diameter, it seems to me not possible to detach the whole viscus with a finger, which is not long enough to reach the very circumference of a centrically implanted after-birth, and, *à fortiori*, not long enough to reach to the remote edge of one not centrically implanted. How shall the accoucheur accomplish the detachment in a rigid and slightly open cervix?

If the os uteri be dilated, or dilatable enough to introduce the hand for turning, the time has arrived for that operation, and there is then assuredly no occasion to detach the placenta. Let the operation be performed at the earliest possible period; for the indication, as in all dangerous uterine hemorrhages, is to let the womb contract, which it cannot effectually do until the ovum is extracted or expelled from its cavity. When that is done, it speedily draws itself to the smallest possible cubic content. Messrs. Simpson, Radford, and the other gentlemen who advocate the new method in placenta prævia, very earnestly recommend the prompt separation of the whole of the placenta, and they are persons whose opinions are justly to be esteemed of the greatest weight; but, notwithstanding the profound respect with which I receive any statement of theirs, I cannot but think that in any case in which it is possible to detach the whole of the placenta, it would be also possible to introduce the whole of the hand, and thus commence at once the operation of turning, which ought to be esteemed as the essential indication of treatment, and which the earlier it is done so much the greater chance does it give both of rescuing the child and saving the woman from fatal losses of blood.

Heretofore, in turning for a shoulder presentation, I have found the placenta lying at the fundus uteri, wholly detached and without any immediate hemorrhage; but I have seen a vast number of most dangerous post-partum hemorrhages, occasioned by coagula filling the vagina, and acting there as a tampon, allowing the uterus to expand again with influent blood, and rendering the orifices of vessels upon its placental superficies nearly as patulous as before the birth of the child. I cannot suppose, therefore, that when I have found the placenta wholly detached at the fundus uteri in a labor, hemorrhage failed to occur because of that detachment; nor can I suppose that, in placenta prævia, hemorrhage is arrested because of the artificial detachment, but rather, in both cases, from association of the hemorrhagic molimen, with the disruption of the utero-placental bond. Let me, before I lay aside this subject, say that, should the Student happen to come in charge of such a labor, and find the woman dangerously exhausted of blood at his arrival, I advise him, when about to deliver, to raise the foot of the bed, so as to let the patient lie upon an inclined plane, the head downwards. I once delivered a poor woman in such a case. The foot of the bed was elevated some fifteen or twenty degrees, so that I might say that I lifted the child upwards in delivering it. Probably I saved her from fatal deliquium by this precaution.

Although I have, already, at page 253 of this volume, made mention of Braun's colpeurynter, and spoken of the applications I have made of it in the case of very obstinate retroversions of the womb, it becomes necessary to show, in this place, the great advantages derivable from its employment in placenta prævia.

No person will ever be able to persuade me that it is either good physiology or sound practice to proceed in curing or rather in trying to cure placenta prævia by detaching the whole placenta, with an incomprehensible notion that to do so, is certainly to arrest the hemorrhage, and that on the erroneous assumption that the blood in this condition runs out of the uterine vessels into certain hypothetical cells of the placenta, and from those cells into the womb or vagina. I utterly deny the doctrine and sincerely hope that the American Student will reject it, which he cannot but do if he will but receive proper views as to the structure and functions of the human placenta.

With these opinions I adhere to the long settled practice of Turning and delivering by the feet in all cases of placenta prævia in which the indication is presented of emptying the womb as soon as it can be safely done. In saying so, I am not forgetful of the fact that I have in placenta prævia delivered by means of the forceps, a case that might occur a few times in one's practice of half a century. Nor am I oblivious of the undeniable truth that some women have had vigor enough to thrust the presenting part of the child upon the placenta prævia and push it rapidly before it, so as to expel the fœtus by a labor so rapid as to prevent the loss of any considerable quantity of blood.

Unhappily, these rapid labors are very uncommon, and the woman is compelled to suffer dangerous and sometimes fatal losses of the vital fluid, before the os becomes sufficiently open to allow a hand to pass within it.

Should the Student find himself in charge of a case of placenta prævia, with excessive flooding and a slow dilating os, he would be sure to reflect that turning is the indication which is to be fulfilled as soon as the os will permit, and he will think that if any measure could be taken to get the os open enough to allow the hand to pass upwards in search of the feet, such measures ought to be resorted to. He has just the thing he wants in Braun's colpeurynter. (*Vide* Fig. 74, p. 253.)

If a colpeurynter should be placed within the vagina, he might fill it with water at 60°, or 50°, or 45°, and he might gently go on with the injection of water into the vulcanized rubber bag until the woman complains of the distension. I have thrown cold water into the sac in such quantity as to make it expand to the size of the child's head; and in doing so I have felt quite sure that I was not only aiding in the process of dilatation, but I was applying a salutary therapeutic means (cold) for the checking of the flooding.

If a head is above the os uteri striving to dilate or force it open, a colpeurynter below the os, and made as large as the head, could not but materially assist the dilatation. Indeed, so effective is the method that, if a woman be seized with the flooding, without any dilatation, a colpeurysis, continued about four hours, generally opens the os uteri enough to allow the hand to pass within and explore for the feet. Such a dilatation, effected within four hours, with the double advantages of being an admirable cold application, would save a large proportion of blood that must be inevitably lost in a case where the dilatation might require twelve or fifteen hours before the hand could pass upwards to Turn. I believe few cases of placenta prævia will, henceforth, be treated by European or American accoucheurs, without the use of colpeurysis; and I trust every Student will, on going into practice, be provided with a set of well constructed instruments of the kind.

Concealed Hemorrhage.—There is another kind of hemorrhage that is met with in parturient women; I mean the concealed hemorrhage. It may take place from the placental surface, and continue to a dangerous extent, without detaching the circumference of the afterbirth from its connection with the womb. In this case, the whole placenta is separated from the womb, with the exception of its rim; and the distensible material admits of so large a quantity of blood being effused betwixt itself and the womb, as to make it take the appearance of a bag filled with blood, and depressed into the uterine cavity. I have never met with a clear sample of this kind of bleeding; but the phenomena that accompany excessive loss of blood would give to an intelligent physician, intimation sufficiently clear to engage him to proceed aright in lessening the bleeding superficies, either by merely discharging the liquor amnii, or by turning, or by delivering with the forceps. The symptoms, under such circumstances, would be weakness; dull pain in the womb; suddenly increased size and tension of the organ; frequency and smallness of the pulse; paleness; yawning and sighing; and syncope. The occurrence of such phenomena, in a pregnant woman, if alarmingly great, would, I think, be a full warrant for opening the ovum, or for an expeditious delivery; the latter always, however, to be held in reserve until the womb is dilated or dilatable. Such a case invariably deserves to be profoundly considered before proceeding to the adoption of an extreme measure. The ergotic action might, with great prospect of advantage, be resorted to, in case the hemorrhagic symptoms should not abate upon the discharge of the liquor of the amnios. I will now show how I lately proceeded in a

CASE.—In February, 1854, Mrs. S—— C——, of —— St., being pregnant near seven months, descended the stairs to dine, being conducted to the saloon by a gentleman who was the guest. At the foot of the last step laid a favorite dog asleep, and she not perceiving it, stepped upon the animal, which made a great howling as if badly hurt —the lady, who was nearly thrown to the floor, was greatly agitated—but recovering, took her place at the table and thought no more of it.

Three days later, she was suddenly seized with flooding, so that a large quantity of fluid and clotted blood fell from her on the carpet, and wetted her dress excessively. She got to bed and sent me an urgent message. I found her in labor—but flowing considerably. As soon as the os became about 1½ inches in diameter, I ruptured the membranes, and not long afterwards the fœtus was expelled dead. I found that nearly the whole uterine face of the placenta was invested with a dense coagulum of a dark almost black hue, and in some places more than half an inch thick. Only a very small part of the placental surface was red or fresh. Hence, I supposed that hemorrhage commenced soon after the accidental mishap above mentioned, and, that three days elapsed before the concealed hemorrhage became open or manifest flooding.

Post-Partum Hemorrhage.—The hemorrhages that take place between the delivery of the child and the expulsion of the placenta, are frequently met with, and are so violent as to excite great alarm in the patient herself, or her friends who happen to witness the distressing symptoms that accompany the accident. I think that, in a great majority of labors, the placenta is partially detached by the time the child's head has emerged from the vagina, and that the complete separation frequently takes place still earlier.

In such women as have feeble pains, with long intervals, the effusion of blood is sometimes very great, so that a large quantity frequently is found to be expelled immediately after the child is born, being evidently the result of hemorrhage taking place in the intervals between the pains, yet detained behind or above the presenting part until the delivery of the child is completed, whereupon it rushes forth with great violence. If this is a correct statement, then it may, *à fortiori*, happen, that the effusion may go on rapidly as soon as the body of the child has escaped. The womb, in some instances, is perfectly passive for a good while after the great effort it has made, and the placental superficies being exposed, a torrent of blood issues and suddenly fills and distends the cavity, and the woman faints and dies without any one perceiving that she has flooded at all. I believe that this blood would always flow out of the vagina, were it not that a firm clot occasionally happens to stop the os uteri, or vagina, like a tampon, so that none can escape; and if the womb be deprived of its irritability, its fibres will offer no resistance to the fluid poured into the cavity, which, being sealed up by a coagulum at the os uteri and in the vagina, must expand more and more, and with a rapidity that augments as the placental surface grows larger and larger.

A careful practitioner ought not to allow such an event to take place, in his presence. He will frequently place his hand upon the hypogastrium of his patient, and ascertain whether the womb be properly contracted, and enforce its contraction, if necessary, by frictions, and by gently pressing the womb with his fingers applied to the lower part of the abdomen. The irritability of the organ is readily excited into effect by this means; and when the womb becomes properly condensed, there is little danger of any effusion taking place. It should be an invariable custom to place, after the child is born, the hand on the mother's abdomen, to make sure of the contraction of the uterus. This custom will always give prompt information of the existence or non-existence of a tonic contraction; and he who fails of attention to this point will, sooner or later, have reason to regret the neglect of so salutary a precaution.

But when flooding comes on, whether after delivery or antecedently to it, the same universal principle of practice is applicable, namely, to empty the cavity as speedily as possible consistently with prudence. Let the placenta be taken away, and, after its removal, let pressure be made on the hypogastrium by the hand, or by a compress and bandage, and the pressure continued until the signs of hemorrhage have completely ceased. After having removed the placenta, or after having turned out from the cavity of the womb a pound of coagula, more or less, the woman cannot be deemed safe until the lapse of an hour or more shall have given assurance that no repetition of the hemorrhage can take place. I have, on a great many different occasions, found myself compelled to turn out the clot again and again, to prevent the patient from falling into fatal syncope. Let the Student, therefore, take heed, that, while he may have saved his patient from fatal hemorrhage at ten o'clock, she fall not into the same hazard again at half-past ten or eleven, or at half-past eleven, being careful not to quit her apartment till he can clearly pronounce her safe. Where the flooding returns again and again, let the Student feel for the pulsating aorta above the fundus uteri, and, pressing the vessel with the ends of his fingers, endeavor so to check or lessen the circulation in that great artery, as to hinder the excess of circulation in the branches below, and so of the uterine arteries. In this way, some lives have been preserved.

It happens that the womb is incapable, sometimes, of separating the placenta wholly from its surface; but if it be half detached, there may flow a great quantity of blood, while the uterus continues unable to expel the after-birth. The duty of the medical attendant here is to separate it entirely, by introducing his hand, and gently detaching it with his fingers; taking every possible care not to leave any portion behind, which, by keeping up a continued irritation, would tend to maintain a hemorrhagic nisus, or even dispose the patient to metritis. He will separate the placenta, then, in order to let the uterus contract for the suppression of the hemorrhage, which it will do as soon as it can thrust the secundines forth from its cavity: but let it be always remembered that the hand is not to be introduced unless real need for it exists.

The greatest care should be taken, in this case, to keep the patient quiet, and strict order should be given not to lift her head from the pillows, until all the appearances of danger are gone. Indeed, she ought to have no pillows. Any attempt to sit up in bed, or even to turn, for a woman excessively reduced by hemorrhage, is dangerous; since any muscular effort, by occasioning faintness or exhaustion, invites a renewal of the hemorrhage and debility, which are both to be deprecated.

Hour-glass Contraction.—I have met with several examples of the hour-glass contraction of the womb; of which incident, although I have spoken of it at p. 340, I desire to add something in this connection. Hour-glass contraction depends either upon the contraction of the womb at the upper limit of its cervical portion, so that the after-birth is contained, as it were, in a separate cell, or the contraction may take place so as merely to include the placenta still retaining its original connection with the uterus. The finger may pass up to the constricted point, and find the cord closely embraced by it. If no bleeding comes on, it is commonly deemed proper to wait an hour, to see whether the co-ordinate action of the muscular fibres will not overcome the horizontal constriction; but, if an hour elapses without the least change in the case, we have reason to infer that two, or even four hours may not suffice to remove the difficulty, and we are always justified in taking away the secundines in that time, even should we not be prompted to do so earlier. It is, in general, not difficult to overcome the stricture, by introducing, first, the hand into the vagina, and then inserting one, then more fingers alongside of the cord, until a sufficient portion of the hand is introduced to command the placenta.

But I can truly say that I have never yet met with an hour-glass contraction in which I was not compelled to separate the placenta with my hand.

I cannot well conceive of an hour-glass contraction, independently of a preternatural adherence of the after-birth to the womb.

I suppose that when the after-birth is so firmly attached that the contractions of the womb cannot slide it off, the substance of the placenta acts as a soft splint, counter-extending the utero-placental superficies. The rest of the womb, having nothing to antagonize it, contracts as usual, leaving the placenta shut up in an upper pouch: it usually contracts at the upper extremity of the cervix. Sometimes, as where the placenta is situated upon the side of the womb, and cannot be displaced by its contractions in consequence of the preternatural adherence, the pouch in which it is contained is on the side of the womb, and the fingers, in dilating the constricted part, must be conducted to the right, or to the left, or to the front, or backwards into the chamber containing the after-birth, as the case may be.

If this explanation be just, there is no very well-founded reason to hope for the spontaneous expulsion of the after-birth—for the adhesion will not give way after the birth of the child, if it would not do so just before that event. Hence, the indication in hour-glass womb is, perhaps, to deliver at once, and I now heartily and warmly advise the Student to introduce his hand and separate the placenta, as soon as he can clearly determine that the real hour-glass contraction does exist.

e will be compelled to do so sooner or later—and the sooner it is tempted, the easier will it be effected.

What can be more disagreeable, or even distressing, than to be mpelled to carry the hand and half of the forearm inside of the dy of a patient already weakened and exhausted by the labor, and, ove all, to be obliged to remove from the womb, while she is ago- zed, the adhering mass, which sometimes is so firmly united as to apparently confounded with the texture of the womb. I am sure at, in performing this painful office, one is occasionally obliged, by sense of duty to the patient, to continue the effort to get off the pla- nta, even when far from certain that he is not either leaving portions the lobules still united to the uterus, or perhaps injuring the uterine sue itself; all that can be expected of any practitioner, under such rcumstances, is that he should faithfully do his duty according to is ability. If he cannot get off the whole after-birth, he must ave portions of its lobules. Let him, however, always try to get ery vestige of it off. To leave an ounce adhering is better than to ave a pound, and he can and ought to protect his own credit against y untoward results by a full and candid statement of the difficulty has met with, and of the impracticable nature of the case. I have ken away a great many such, and all of the women save one have covered, even where I was certain that my utmost care and desire succeed in removing the whole had been in vain. The Student ill learn that he will rarely, in practice, meet with these vexatious hesions in cases that go on regularly and with a proper celerity; at if he have a labor that gives him great trouble and long detention, om irregular action and feebleness of the pains, he may justly fear that e after-birth will not come off easily. I doubt not that a very firm hesion of the after-birth is capable of greatly impairing the regularity nd strength of the uterine contractions. Such an after-birth, by pre- enting that part of the womb in which it is situated from contracting due proportion with the other parts of the organ, is probably the ause of most of the difficulty we have to contend with throughout e whole parturient process in such a case. When the placenta heres with such preternatural force, the uterine surface on which it ts is, to a certain extent, splinted or counter-extended during the ontractile efforts of the rest of the organ.

If one could suppose a placenta converted into bone, and retaining uch preternatural union with the womb, it is clear that so much of he organ as should be united to it could not contract, and that all he rest of the womb might contract, shutting the ossified placenta ithin a cell.

But, in fact, when the adhesion is so strong that the uterus cannot abolish it by its contraction, the same result is virtually attained as if the ossification above supposed should really exist.

Hemorrhage following delivery of the After-birth.—The application of a compress, made by folding one or two napkins, and securing them upon the lower part of the abdomen by the common bandage, is a precaution that ought never to be overlooked where there is a great disposition to hemorrhage. Such a pressure not only prevents the womb from filling again, but it tends very successfully to secure a firm tonic contraction of the organ. Besides this compress, we shall find that the sacchar. saturni, combined with opium, in doses of three or five grains of the former, with from half a grain to a grain of the latter, repeated in an hour, offers us a very useful resource in the styptic influence of the acetate of lead. In like manner, infusion of red rose-leaves, with elixir of vitriol; powders composed of five or ten grains of sulphate of alumina, with a few grains of nutmeg; and the application of cloths pressed out of cold vinegar and water to the pubes—all these are measures that must be sometimes resorted to, when the flow of blood continues after the delivery of the secundines has taken place.

Violent and dangerous effusions of blood sometimes come on immediately after the delivery of the placenta, and at a time when the labor is supposed to have been terminated in the most successful and fortunate manner. If half an hour elapses after the delivery of the after-birth, without any flooding, we shall rarely meet with it, and may, for the most part, consider the patient safe. Nevertheless, it does sometimes come on many hours later; or even many days are passed, without any apparent tendency to the accident, before the female is attacked.

The causes of this bleeding are to be sought for in the relaxed state of the womb, arising from loss of power in its muscular element. The cases are almost invariably connected, too, with an excited and impetuous circulation, by which the blood is propelled with such power and momentum into the uterine arteries as to force open their extremities, when they are not sufficiently supported and constringed by the muscular contractility of the uterus.

Such an attack ought to be foreseen in the state of the pulse, and obviated by the use of such measures as may serve to abate the violence of the blood's motion; and the patient ought not to be abandoned by the physician, until he has become fully satisfied that the danger is past. Let the patient lie in a truly horizontal posture; let blood be taken from the arm if required; let cool drinks be given, and cold water applied to the face and forehead; and let great care be taken to ascertain, from time to time, by the touch externally, whether the womb is firmly condensed or not. It is not good, I am sure, to allow the napkins that are usually applied to the vulva, to be too firmly pressed to the parts; they act, when so pressed, as a sort of tampon, which enforces the coagulation of the blood in the vagina; and that itself is a dangerous tampon. The blood which cannot escape accumulates within the womb and constitutes a concealed hemorrhage, that is likely to increase with frightful rapidity and that may sink the patient irrecoverably by the time it is discovered. When blood has once escaped from its vessels, it is of no further service, and therefore the sooner it is got rid of, the better for the sufferer.

If the Student should find the hemorrhage not to be stayed by his treatment, let him press his fingers, gathered into a cone, firmly down upon the aorta, near the umbilicus. If the patient should not be troubled with extraordinary obesity, he will be able to feel the throb of the aorta with the points of the fingers. Let him compress the tube according to his judgment, in such a way as to check the downward rush of the torrent. This will operate usefully in two ways: first, by lessening the force with which the blood reaches the bleeding orifices, which will then have an opportunity to close themselves more or less completely; and second, by causing a greater determination of blood to the encephalon, whereby the tendency to deliquium will be lessened. Many lives have apparently been saved by thus compressing the aorta.

I have always governed myself as much as possible by the rule acted on and enforced in his lectures by the late Professor James, which was, "Don't leave your patient for one hour after the termination of the labor." The pressure of business upon a medical man in a large practice will sometimes make it impossible to stay so long near the lying-in woman, but, when under the necessity of leaving her, he ought always make arrangements for his recall in case of need. Leaving a newly-delivered woman a few minutes after the deliverance, he exposes himself to the shock of hearing, upon his return to his house after one or two hours, that "Mrs. B. wants him immediately, as soon as possible—has sent again and again—they think she is dying!"

I have many times been saluted with such messages, and it would be difficult to express the emotions they excite. It is true that most of the cases are neither fatal nor even dangerous; yet occasionally a woman is found to sink and die, almost without warning, from effusion of blood which either flows out upon the bed, or is retained within the vagina and womb, distending them enormously, without giving rise to the least suspicion in the friends or nurse that the woman is bleeding.

In case of being summoned in this sudden manner to return to the patient, it is obviously the first duty of the physician to make sure of the state of the womb; and accordingly as soon as he reaches the bedside, he should place his hand on the hypogastrium in order to learn whether the organ is too much distended; if it be found too large, his course is plain—he must break up the clots which fill it and press them out. This is to be done in every such case. If it be not too much distended—and yet there are those signs of weakness which show that the patient has lost too much blood, while no great external or open flooding has taken place—he should still act as if there were really a hemorrhage. Let him then introduce one or two fingers into the vagina, and he will be almost sure to find that the tube is filled to distension with a very solid clot—a clot as large, perhaps, as a child's head, and extending up into the womb. Upon tearing this clot with his fingers, and pressing at the same moment with the other hand on the lower part of the belly, and exhorting the woman to bear down, the coagula are expelled with more or less violence, and the woman immediately expresses herself as relieved. I must reiterate in this place the injunction, never to forget that, in uterine hemorrhage, all proper measures must be taken to cause the womb to contract; never to forget that with a condensed womb there is no hemorrhage, nor that the womb will nearly with invariable certainty contract or condense itself, if some antagonist or distending force does not prevent. Remove or withdraw, therefore, the antagonist force, and the patient is saved. Always turn out the clot.

The bandage for the abdomen ought never to be omitted in these cases of flooding; for the belly growing suddenly flaccid by the contraction of the womb, there is produced a feeling of inanition and weakness, that often is, alone, able to bring on faintness or a state approaching to it; and that is highly conductive to the increase of uterine hemorrhage. I have already, in my remarks on labors, spoken on this topic, and will refer my readers to page 360 of this volume.

I have long been impressed with the beautiful simplicity and graphic fidelity of the following affecting story, from the pen of the celebrated Mauriceau; and as his writings are little known in the United States, I have, on that account, as well as for the intrinsic practical importance of the case, resolved to translate it for this part of my work. Those who read it must, I think, agree with me, that it conveys a most instructive lesson to the Student of Midwifery, and, if I am not mistaken, will require no apology for its introduction here.

Case of Mauriceau's Sister.—"Many women (says Mauriceau, liv. i. p. 158) have perished, together with their offspring, for want of prompt assistance on such occasions [hemorrhage]: and not a few have escaped from an otherwise inevitable death by early succor; while their children have received the holy sacrament of baptism, of which, but for that aid, they would have been deprived. Guillemeau, in liv. ii. chap. 13, of his *De l'Accouchement*, mentions six or seven cases confirmatory of this truth, in most of which it is seen that both the mothers and their children were the bleeding victims of want of promptitude in delivery under such circumstances, while some of them escaped in consequence of early assistance. But, that I may confirm this doctrine by the results of my own experience, I shall relate one case, among many, that is very remarkable; and the remembrance of which is so vividly impressed upon me, that the very ink with which I now am writing, in order to make it known for the benefit of the public, seems to me to be turned into blood; for on that piteous and fatal occasion, I witnessed the effusion of a part of my own vital fluid, or, to speak more correctly, the whole of what resembled the blood of my own veins.

"It was sixteen years ago that my sister, who was not yet quite twenty-one years of age, about eight months and a half gone with her fifth child, and at the time in excellent health, was so unfortunate as to hurt herself, though to all appearance very slightly, by a fall on her knees, the belly at the time striking the ground; subsequent to which she passed a day or two without experiencing any considerable inconvenience, so that she neglected to keep herself as quiet as she ought to have done; but on the third day, at about eleven o'clock in the morning, she was suddenly seized with strong and frequent pains of the belly, which were also accompanied by a great discharge of blood from the vagina. She immediately sent for the midwife, who was not too well versed in her occupation, and who, when she arrived, informed my sister that it was necessary, before delivering her, to wait until the pains should spontaneously open the mouth of the womb, assuring her that she had nothing to fear from the accident, and would be soon delivered, because the child presented very favorably. In this way, she fed her with vain hopes for three or four hours, until, the flow of blood continuing very great, the pains began to leave her, and the poor lady fainted away several different times; upon seeing which, the midwife requested that a surgeon might be sent for to assist her. They came immediately to my house, to notify me of the affair; but being unfortunately not at home, they called on one, who, they supposed, was one of the ablest obstetricians or surgeons in the whole city at that period, and he was immediately conducted to my sister's residence, where he arrived about four o'clock in the afternoon. Having seen the state she was in, he contented himself with merely saying that she was a *dead woman*, for whom nothing was wanting but the last sacraments of the church, and that it was absolutely impossible to deliver her. To all this the midwife readily agreed, for she thought the opinion of this man, so universally esteemed, must be, beyond doubt, correct. As soon as he had pronounced his judgment, he went away, refusing to stay any longer; and in this deplorable condition, and without offering the smallest succor, he left this lady, whose life, as well as that of her child, he could certainly have saved, had he delivered her then, which he might easily have done, as will be seen in the sequel of this history.

"After the judgment of a person of such great reputation, added to that of the midwife, every one who was present thought that since M. ——— could do nothing for her, there could be no other recourse, in so great a misfortune, than placing confidence in God, to whom alone everything is possible.

"They now endeavored, as well as they could, to console my poor sister, who with a passionate earnestness desired to see me, that she might know whether I also would pronounce the same judgment upon her; and whether her disease, which was constantly growing worse, was beyond all remedy; for her blood was steadily flowing in great abundance. At last, I returned to my house, where they had been a long time before, to tell me this sad news; and where most unfortunately, I was not to be found at the time, as I have already related. As soon as I heard of it, I hastened to her house, and upon arriving there, saw so piteous a spectacle, that all the passions of my soul were, at the sight, agitated with many and different emotions; after which, having somewhat recovered my composure, I approached the bedside of my sister, who had just received the last sacraments; and being there, she implored me again and again to assist her, saying, that she had no hope but in me. After I had learned from the midwife all that had happened, and she had told me of the opinion of the surgeon, who had seen her more than two hours before, for it was now past six o'clock, I perceived that the blood still continued to flow profusely and without ceasing, though she had already lost more than three quarts, and, what is remarkable, more than forty-eight ounces within the two hours since the surgeon left her—as I supposed from the

merous napkins and cloths which were all saturated with it; which
od, by remaining in her body, had she been timeously delivered,
uld, beyond doubt, have saved her life. I also saw that she was
zed almost every minute with sinking turns, that were increas-
; which convinced me that she was in far greater peril than she
ld have been had they not lost the opportunity of delivering her
or three hours sooner, which was both possible and of easy execu-
n; for at that time she had almost the whole of her strength, which
afterwards lost by the continual effusion of her blood. Wishing
know whether it was true that she could not be delivered, I found,
n examination per vaginam, the orifice of the womb dilated, so as
ily to admit two or three fingers. Having remarked this, I made
midwife examine her again, in order to ascertain whether the os
ri had been in the same state when the surgeon stated that she could
be delivered; and whether she was still of his opinion: she told
, 'Yes,' and that the parts had remained unchanged ever since he
l gone away. As soon as she made this declaration, I perceived
ignorance, and what had been the difficulty with the surgeon.
uching this, I told her of my astonishment that they had both been
such an opinion, as I was of a wholly different opinion—for it
uld have been as easy for him to deliver her then as now; which
hould, in truth, have immediately done myself, could I possibly
e commanded my judgment, long vacillating upon this resolution,
ich, from the loss of all hope from other quarters, I was at last con-
ined to adopt. What hindered me was, not the prognostic of the
geon, celebrated as he was, who had persuaded everybody that to
iver her was impossible (for it would seem like rashness to resist
dicta of those who are looked upon as oracles), nor the weakness
the patient; but it was chiefly the quality of the person, who was
own sister, and whom I tenderly loved, that agitated my mind
h various passions. For my mind was so preoccupied with seeing
ready to expire before my eyes, from the prodigious waste of that
od that had sprung from the same sources as my own, as to make
mpossible for me to come to an immediate resolution and action.
is obliged me to send incontinently for the surgeon who had left
so long before, and beg him to return to her house, so that I might
w him how easily she could be delivered—and by making him
lerstand and confess that there is no hope on such occasions except
prompt delivery, induce him to operate instead of leaving the
ther, as he had done, to despair, and allowing her infant to perish
hout baptism, which it might have enjoyed had he obeyed the
uirements of the art; which are, that if both cannot be saved, we

should at least, try to save the child, if that be possible without doing anything prejudicial to the mother. But he would not come back for all the prayers and solicitations that could be offered; and excused himself by saying that it would be impossible to do anything in such a situation. As soon as I learned all these things, I sent for another surgeon, with whom, had he come in time, I should have concluded in favor of the necessity of the operation, of the possibility of which I could have satisfied him; but, as misfortune would have it, he was absent from home. Meanwhile, at least more than an hour and a half more elapsed, during which the blood was incessantly flowing, and the faintness increasing more and more. Finding myself, therefore, hopeless of the aid of the persons I had sent for, I resolved to deliver her myself immediately, for I had not been able to resolve upon it, except in this extreme necessity, for the reasons already given; which, indeed, was somewhat too late for the mother; for, had I been able to command myself sufficiently to proceed to the delivery at my first arrival, there was great reason to hope for her safety, as it afterwards proved as to her child, when I had completed the task in the following manner:—

"I introduced two fingers into the orifice of the womb, which was open enough to receive them; I then gradually inserted a third, and little by little, the ends of all the fingers of my right hand, with which I so dilated the orifice as to admit the whole hand, which is readily to be done on such occasions, because, as has been already said, the abundant discharge of blood moistens and relaxes the entire womb very much. Having introduced my hand very gently, I found that the head of the child presented, and that the waters were not yet gone off, which obliged me to break the membranes with my finger nails. Having done this, I immediately turned the child so as to draw it down by the feet, which I easily effected, as I shall describe the operation in the 13th chapter of the second book. The operation was effected in less time than it takes to count a hundred, and I protest upon my conscience, that I never in my life performed an accouchement (of a preternatural case) with greater ease and expedition, or less pain to the mother, who never complained in the least during the operation, notwithstanding she then was quite herself, and knew perfectly well what I was doing. Indeed, she found herself quite relieved as soon as I had delivered her, whereupon the flow of blood began to cease.

"As to the child, I delivered it alive, and it was instantly baptized by a priest who was in the chamber. The patient and all the bystanders, who were numerous, then perceived very clearly that the surgeon and midwife who had pronounced it impossible to deliver her, had done so without any good reason.

"The operation was performed in good time to procure baptism for the child, who received it, praise be to God, as I just now said; but it was too late to save the life of its mother, who died an hour after its birth, in consequence of having lost too great a quantity of blood; for she fell into a great swoon, like those she had had previously to the delivery. The flow of blood ceased, it is true, but there was not enough left in her body to resist these frequent syncopes, which she could doubtless have done, had the surgeon, who saw her first, delivered her three full hours earlier, as he could have done, without doubt, as easily as I did it; since which time she had lost, without exaggeration, more than eighty ounces of blood, twenty of which, had it been reserved, would have insured her escape; particularly, as she was a young woman, of a good constitution, free from all disease or inconvenience at the time she was attacked by this fatal accident, which happened, as before said, at eleven o'clock in the morning. She was delivered at seven in the evening; but the operation was unsuccessful for her because she had been drained of blood; she died an hour afterwards, in full possession of her senses, and speaking until the last moment of her existence, which was at eight o'clock P. M."

Convulsions.—Among the many grave and alarming accidents that occur to pregnant, puerperal, and lying-in women, the puerperal convulsion is regarded as one of the most dreadful; it never breaks forth without carrying terror among all the spectators, and the scenes exhibited during one of its paroxysms cannot be observed without emotion even by the most experienced and use-hardened physician. There is scarcely any trouble for pregnant women that I would not prefer to witness, rather than this shocking and distracting one, and I say so after an ample experience of almost every possible form of obstetrical horrors.

It would seem that any person conversant with the nature of obstetrical disorders, accidents and tendencies, ought not to feel surprised at the outbreak of a paroxysm of eclampsia in a pregnant woman not as yet advanced to her term, and much less in a woman enduring the pains, terrors and fatigue of her labor, for labor is almost always attended with augmented impetus of the blood's motion, and with those coincident changes in the animal heat, sensibility and irritability I have already discoursed of in a former page. Whether we advert to the changed susceptibility of the pregnant woman, which develops a state closely allied to the hysterical condition; or whether we consider the extreme violence with which the blood of a woman in labor rushes along the arteries of the encephalon, we must admit that the brain cannot but be in an excited state and prompt to exert its powers in such a manner as to convulse the whole or part of the muscular system: the activity of the cerebro-spinal system is always proportioned to the quantity and impetus of the blood circulating in the vessels, and every woman in labor whose pulses become hard, large, frequent and violent, ought to be held liable to be convulsed by the neurosity extricated in consequence of such a circulation. An experienced practitioner is invariably surprised when he observes no augmentation of the blood's motion in a severe labor, for it is a rule attended with rare exceptions, that the heart beats with excessive force, and that the arteries are highly charged and loaded with blood during the pains and exertions of the parturient state. Long protracted pressure of the womb on the parts in the abdomen that may have produced œdema gravidarum, must also in some measure have impeded the downward course of the aortic current, and checked the flow in the emulgent veins. The effects of such impediments are inevitably to cause protracted, habitual hyperæmia of the brain and cord, and to fill the vessels of the kidneys, and so interfere with the secerning action of those important organs. Thus is laid the foundations of the double mischief of an over-filled encephalon, and of an engorged or hyperæmic kidney; which is one of the stages of Bright's disease, and which cannot but vitiate the mass of the blood.

When a woman whose blood has become impure by the retention of the principles of the urine within it, and who has had habitual hyperæmia of the brain and cord, has safely passed through the perils of parturition, only a few hours are required to wholly remove the encephalic fulness and take away the renal engorgement, and so remove altogether the conditions that had brought her life into peril: even where she may have been seized with eclampsia, and that of the most violent grade, she very soon recovers her health, after the birth of the child; provided some lesion of the brain, the cord, or an internal viscus has not taken place during the violent stages of the convulsions. In such an event, she could not be expected to recover speedily, and where the lesion has been a grave one, perhaps not at all.

The pregnant woman who reaches her term and falls into labor without having suffered from œdema or other results of pressure, will rarely be found to have an attack of puerperal convulsions; while every woman who has swelled feet and legs in her gestation; every woman whose urine, on being tested, exhibits the presence of albumen; all those who complain of headache, transient seizures with amaurosis, tinnitus aurium, deafness, convulsive twitchings, red and tumid hands and fingers, and all in whose urine casts of the tubuli uriniferi are discovered by the microscope; all such people should be regarded as in danger of convulsions either before, during, or after the labor, and watched and treated accordingly. The omission of such precautions is the real cause why the attacks are so numerous, and the observance of a due degree of vigilance would, without doubt, greatly lessen the ratio of the cases in a given number of parturitions. But no such needful vigilance and no such wise precaution can be expected except a proper understanding is first obtained of the nature, causes and treatment of the disorders of pregnant women.

I shall not repeat, in the present connection, what I have already said at p. 240, on the subject of the pressure and obstruction consequent on it, within the abdomen. I have there and elsewhere said enough to put the Student on his guard, and teach him that he can, and that he ought to ward off the attack of convulsions, which it is far easier and better to do than to cure it after it has come on. It is far better, I say, to ward it off, because it is impossible to witness a seizure and not fear that some fatal effusion, or some mortal rupture and extravasation will take place in the brain, during the paroxysm. Not, indeed, few are the cases in which a fatal blow is struck at the very onset; so that the woman who feels it, never speaks nor recovers in the least from the moment of the invasion, but dies apoplectic, and sometimes outright.

For some women, to be pregnant is to be in the best possible health, while for others the state of gestation is but a protracted disorder, in which the constitutional irritation is analogous to the hectic state. They are feverish from the beginning, suffer from nausea, cephalalgia, pains in the limbs and trunk; become œdematous, hydræmic, hysterical; are seized with albuminuria; experience what is called uræmic intoxication; and run the greatest risk of dying in childbed with eclampsia. Every such woman is in the condition denominated by Wiegand convulsibilitat. I have treated multitudes of women affected with this convulsibility, and in most of them I have warded off attacks of convulsion that appeared to me to be imminent, while, in some few, the seizure has taken place in despite of all my vigilance, all my precautions, and my most carefully considered prescription.

I feel very sure that precisely the same sort of convulsions as those that attack pregnant women do affect both men and children, as well as virgins, and no one, I presume, will now deny that the most exquisitely marked examples of puerperal eclampsia do occur, without any discoverable complicity with morbus Brightii or other visceral disorder, or that numerous individuals with albuminuria do go through labor without convulsions. So convinced am I that the disorder is one of the effects of the impetus sanguinis and the cerebral and spinal hyperæmia, and a result rather of the quantitative than of the qualitative force of the blood, that I have placed at the head of this article the words puerperal convulsions instead of the words puerperal eclampsia, which, if I had obeyed the dictates of our modern fashion in medicine, I should have chosen for its caption.

The Student, therefore, will please observe that I have placed the words puerperal convulsions at the head of this article because I was unwilling to follow in the track of a small number of writers, who have recently regarded puerperal convulsion as symptomatic of the morbus Brightii in pregnant women, and who limit the use of the word eclampsia to cases of albuminuria with uræmia, in pregnant women.

The researches of Dr. Blackall and Dr. Bright relative to dropsical and other affections, led to the detection of certain diseased conditions of the kidneys, which, in consequence of his publications, have been called Bright's disease, or morbus Brightii. Dr. Bright's first case, which led to his important investigations, was observed by him in the year 1825. These researches ended in establishing the opinion now, I believe, everywhere adopted, that the urine becomes loaded with albumen wherever Bright's disease exists, and that Bright's disease may consist either in hyperæmia of the kidney, in granular or fatty degeneration of it, or in atrophy of the organ, in any of which states the nitrogenous element accumulates beyond normal measure in the blood, and so, gives rise to uræmia, or urinous blood. Meanwhile, the blood loses a large portion of its albumen, which passes off in solution by the kidneys. Any person in whose blood is accumulated a certain extra quantity of urea is poisoned thereby, intoxicated, or disordered by what is denominated uræmic intoxication. This toxic condition is manifested by weakness, by vertigo, by amblyopia, by hemeralopia, amaurosis, startings of the tendons, and by convulsions resembling epileptic fits, but which are true eclampsias, none other being so except these uræmic convulsions. Such is the doctrine they teach.

It is well known that certain animal products remaining within, from want of elimination, and others accidentally entering the vital stream, do produce disorders whose characteristics depend on the nature of the noxious material or residue accumulated in the blood. Thus, in cases where pus enters the circulation, as in pyogenic phlebitis, the symptoms of purulent intoxication become obvious and peculiar. The influence of opium, tobacco, wine, belladonna, arsenic, pus, urea, &c., are each peculiar, though they all give rise to states of intoxication, so that there may be vinous, alcoholic, cinchonic, pyæmic, cholæmic, or uræmic intoxication. All these forms of intoxication, or, to speak more correctly, all these toxic conditions differ according to the special powers of the poisoning material, and there is as great a difference between the intoxication of uræmia and pyæmia as there is between the intoxication of beer and that of chloroform, ether, or champagne.

These modern writers insist that the convulsions of pregnant women are effects of uræmic intoxication, and they regard the cases as special, and as requiring a special and distinguishing name. Hence, they call those convulsions eclampsia, and the word signifies albuminuria, uræmia, or morbus Brightii, three expressions that are really synonyms.

In ordinary cases, however, of dropsy from Bright's disease of the kidney, convulsive disorders appear not to occur so frequently as they do where the uræmia occurs in a pregnant woman. Dr. Bright, in his 4to. vol., *Reports of Med. Cases*, &c., 1827, found in his first 25 cases only two instances (cases 12 and 13), in which convulsions occurred. The Case 12, Gallaway, occurred in a broken-down syphilized drunkard. The 13th case, Drudget, died convulsed on the seventh day after his admission into Guy's Hospital. The other 23 cases of Bright's disease evinced no convulsive affection whatever. In 35 other cases by Dr. Bright, related in *Guy's Hospital Reports*, p. 189, for 1843, there were only three instances of convulsion—thirty-two of the number having been exempt.

Dr. Imbert Gourbeyre, whose admirable prize essay illustrates the 20th vol. *Mem. of the Imp. Acad. of Med. of Paris*, 1856, tells us at p. 341, that in 164 observations of albuminuria in pregnancy, by various authors, whose names he cites, there were 94 cases of albuminuria accompanied with eclampsia, 65 cases of albuminuria without any eclampsic attack, and 5 cases of eclampsia in women whose urine contained no albumen. In 41 albuminuric pregnant women, Blot found only seven of them attacked with eclampsia.

Will the Student then endeavor to settle for himself the question, whether "the presence of urea in the blood does or does not cause the convulsions of puerperal women? Will he determine whether or no every albuminuric is a uræmic woman? Will he consider whether the hyperæmic state of the brain induced by the presence and obstructing pressure of the gravid womb, and the hysterical tendency superinduced by the state of pregnancy, by panic, by pain, by fatigue, by violent haste in the circulation, by modifications of the blood brought about in the increased throbbing of the heart, the muscular effort, &c. &c., may be fairly admitted as coequal at least with the uræmia or albuminuria in the causation?"

It is to Dr. J. C. W. Lever, the distinguished accoucheur at Guy's Hospital, London, that we are indebted for the first intimations of some connection of albuminuria with puerperal convulsions. In *Guy's Hospital Reports*, vol. i., second series, p. 495, the Student will find Dr. Lever's paper, entitled "Cases of Puerperal Convulsions," with remarks by J. C. W. Lever, M. D. In the four first cases in Dr. L.'s series of 14 cases, the state of the urine was not noticed, and it was only in Case 5 (Ellen D——), that "the great similarity that presented in her appearance and that of patients laboring under anasarca with the morbus Brightii," induced to an examination of the urine. It was found to be highly albuminous; and though it might perhaps have been owing to some transient cause, Dr. Lever "examined the urine in every case of puerperal convulsions that has since come under 'his' notice, both in the Lying-in Charity of Guy's Hospital, and in private practice; and in *every case but one*, the urine has been found albuminous at the time of the convulsions." Dr. L. further investigated the urine in more than fifty women in labor. In no case did he detect any albumen except in those in which there had been convulsions, or in which symptoms readily recognized as precursors of childbed fits were noticed.

CASE.—Philada., Sept. 9th, 1856, 2 o'clock A. M. At one o'clock, just an hour ago, I delivered Mrs. S. S——, a primipara, 22 years of age, of a daughter, after a labor of 15 hours, in which she suffered more than women commonly do.

Two weeks ago, I observed her feet to be œdematous, and took away a portion of the morning urine, which proved by nitric acid and by ebullition to contain no trace of albumen. Yesterday morning, Sept. 7th, at 10 o'clock, I found her in pain, and with increased œdema of the feet, which pitted on pressure. On testing the urine by heat in a test tube it was found to contain about 20 per cent. of albumen. She was pale, but in very good spirits. The labor pains having become frequent, I was called to her at 6½ P. M. She had rigidity of the os uteri, and seemed to suffer excessive anguish when the pains were on. At 11 P. M. she said she was dizzy, but without headache, and though the pulse was not very large, frequent, or hard, I took 10 ounces of blood from the arm. The child was born as the clock struck one—the placenta came off in seven minutes, and I came away to make this note. Now here is a case of Bright's disease, or uminuria, in a primipara, who, throughout a most painful labor of hours, exhibited no sign whatever of coming eclampsia, unless in-ed the slight vertigo above mentioned was such a sign. I left her half past one perfectly comfortable, and I expect that the urine of e 10th inst., two days hence, will display no signs of any remaining rbus Brightii. Was Mrs. S. uræmic? She had no uræmic intoxica-n. Sept. 9th, 10 o'clock A. M. Mrs. S. is as well as people usually e in the first day of a lying-in. Sept. 11th, 10 o'clock P. M. Neither e urine of last night or that of this morning contains any trace of bumen; so that a very considerable albuminuria has disappeared.

Dr. Lever's statement above cited was made in the vol. of Reports r 1843, now 13 years ago, since which time the idea has gradually erspread the republic of medical letters, and has of late made great rogress, particularly since 1850, as any one may perceive who will amine the bibliography of the subject given by Gourbeyre. That uthor says the word uræmia, ουρεω and αιμα, made its first apparition the French press in 1854, in the *Gazette Hebdomadaire*, vols. iii. and v. Since that year the word uræmia is become in very general use in urope and in the United States.

I have already indicated the causes that should inevitably give ise to the œdema of pregnant women, and pointed out the reasons hy those causes should equally operate to establish a hyperæmic tate of the encephalon, the superior extremities, the lungs, &c. It is lso manifest that the intrusion of a gravid womb into the abdomen, hrusting away in its rise the whole mass of the intestines, often in regnant people overburthened with residues of digestion, must exert considerable obstructing influence on the emulgent veins. Any rrest or stasis of the renal circulation thus produced could not but ring about a transient morbus Brightii, which consists in engorge-nent or hyperæmia of the kidneys; but inasmuch as the most enor-nous œdema gravidarum is usually found to disappear within three or our days and sometimes sooner, after the birth of the child, so, the yperæmia of the kidney, arising from obstructed emulgent veins, ight disappear in like manner and from the same cause. In fact, the lbuminuria puerperarum does disappear very soon after the birth; nd that, whether the woman has had eclampsia or not. If this be a orrect view of the facts, I see not what shadow of reason any man an discover for attributing the convulsion to the uræmia, rather than o the engorgement, hyperæmia, or increased impetus sanguinis in irculation. In the meanwhile I am very far from maintaining that he constitution of the blood is an indifferent in the causation, for do believe that blood rendered morbid or abnormal, by whatsoever cause, cannot but prove promotive of various disorders of the nervous mass, as well as of the tissues it governs and innervates, to maintain them in their power and their life.

But the Student should endeavor to obtain a clear and concise opinion as to Bright's disease of the kidney, and therefore he should ask what is Bright's disease? Dr. Bright, himself, *Reports*, &c., p. 67, considered there are three varieties, viz: the first, which he deemed to be a hyperæmic state, in which the kidney loses its firmness, has a yellow mottled appearance, with gray appearance when incised, and with the tubular portion of a lighter color than natural. In the second form the whole cortical portion becomes a granulated texture, with copious interstitial deposits of opaque white substance. In the third form the kidney is rough or scabrous to the touch, with numerous surface projections as big as pin-heads, yellow, red, and purplish. Such are the generalities, which I can only state here for want of space to fill out the picture at length, after the author. But this is sufficient to show that engorgement of the kidney from pressure on the emulgent might well, and must ofttimes, in pregnant women, cause the very greatest hyperæmia of the kidney, and so bring about those lesions of structure or function that result in albuminuria. If this engorged state should end in inflammation of the kidney, we might well expect to discover altered appearance of it, and great alterations in the excreted matters. For example, if a portion of the urine should be drawn off with a catheter and put aside to settle—and if, after becoming completely settled, a drop should be taken by a small pipette from the bottom of the vase or glass, and examined by a microscope, the saline and other substances that should fall to the bottom of the fluid could be seen and studied. Accordingly it does happen that we perceive not only the salts, as urates and phosphates, but what are called tubuli-cylinders, or casts of the tubuli uriniferi. They are probably either cylindrical coagula of albumen moulded in the tubuli uriniferi of the pyramids, or they may be true exudation-corpuscles shed by inflamed mucous membrane of the tubuli, and cast off, like croup deposits in a larynx. These cylindrical casts are very commonly to be discovered in pregnant women who suffer from œdema and other allied symptoms, as hydræmia, transitory forms of amaurosis, tinnitus, cephalalgia, &c. &c., which the modern neology interprets as uræmic signs, but which the older school explained by the pressure and obstruction. Let the Student choose for himself which school he will follow—but let him never fail, when consulted about a pregnant woman's health, to examine, first her feet, to learn whether they be œdematous or no, and if they be found swollen, let him dread an eclampsia if she be primipara, and particularly if she have a bounding pulse and the slightest cephalalgia. For a great many years past, long before the name uræmia was concocted by the Germans, I have never failed to inquire for œdema in pregnant patients of mine, nor ever failed to be wide awake and watching for the signs of coming eclampsia, if to my question, "How is your head," there came the alarming reply, "It aches." If upon hearing such an answer I failed to open a vein for my patient, I felt guilty of gross neglect of duty, and for the most part was punished for the offence by being compelled to witness the shocking spectacle of a patient in eclampsia.

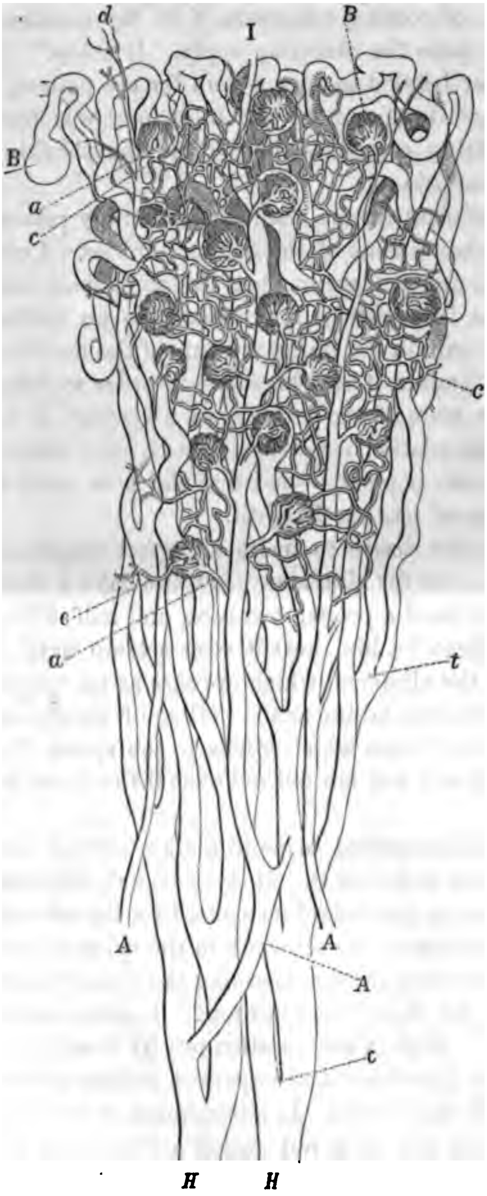
For my own part, it is sufficient for me then to see that my patient is a primipara, and that she has œdema of the feet and ankles. I can never look upon such signs and not see in them the threatened mischiefs of eclampsia. Still it is wisest for the Student to go farther than this, and discover, if he can, in the lowest stratum of the morning urine, any tubuli-casts, or cylinders, if any there be—in order to judge from them in regard to the state of the kidneys as a viscus. If he believes the tubuli-casts are exudation corpuscles, then he must believe that the patient has albuminous nephritis—and that she is in peril of passing into the second stage of morbus Brightii.

The same motive, to wit, the desire to make a perfect diagnosis, should lead him to test the urine for albumen. Let him take a clean iron spoon, if he have not at hand a proper test-tube, and half filling it with the urine of the patient, let him heat it over a lamp until it boils. The heat coagulates the albumen, which appears as an opaque substance in the urine, or as shreds falling to the bottom of the spoon, or granules, or lastly, as a solid mass which sticks to the spoon like so much boiled white of egg, and will not fall out even if the spoon be turned bottom upwards.

Or let him put some of the suspected urine in a glass or in a test-tube, and drop a drop of nitric acid into it. If there be any albumen there it will be at once seen in the coagulum caused by the admixture of the acid. The proportion of the albumen in the urine should be calculated so as to get at some opinion concerning the quantity lost.

What now is albuminuria, for that is the question? Is albuminuria a disease or is it a symptom? Such is the question put by Gourbeyre. Is albuminuria a leak from a disordered and imperfect kidney of one of the important materials of the blood? Is albuminuria a result of modified power of hæmatosis, and is it not rather a disease of the bloodvessel, the endangium, than of Bowman's capsules or Malpighi's corpuscles? Gourbeyre quotes Frerichs to show that in 292 *post-mortem* examinations of morbus Brightii, the lesions of the kidneys were more numerous than any others; there was heart disease 99 times, emphysema 77, diseased liver 46 (22 *cirrhosis*), disease of the spleen 30—p. 52. Dr. Gourbeyre insists that morbus Brightii, commonly called albuminuria, and albuminuric nephritis, is nothing more or less than disalbumination of the blood, and that disalbumination of the blood may take place in persons whose health is perfect as far as the kidney is concerned, and in whose urine neither tubuli-casts nor the least trace of albumen can be detected. What then, I repeat, is albuminuria of gestation? Is it not a vitiated state of the blood, dependent on morbid changes superinduced by pregnancy in the blood-membrane, and is it anything else than a symptom of hydræmia? Is it not in many of the cases developed during the labor in consequence of the violence of the circulation? The very strongest advocate of the doctrine of uræmic intoxication as causative of eclampsia, Dr. C. Braun, says, at p. 282, *op. cit.*, that there is no constant relation of the quantity of albumen in the urine to the period of labor in which the convulsions break out, but the amount of albumen does

Fig. 91.

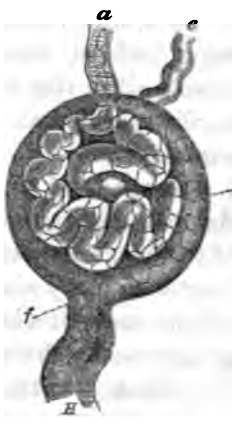


augment in the ratio of the repetitions of the eclampsic paroxysms. To me it appears that this admission strengthens the opinion that childbed fits depend not so much on the qualities of the blood, as on its impetus in circulation, and that its morbid qualities are rather results than causes.

To set the matter more clearly before the eyes of the Student, I annex two figures, which I have taken from Ecker's edition of *Rudolph Wagner's Icones Physiologicæ.* Fig. 91 is a magnified section of a portion of kidney, in which the artist has represented several of the tubuli uriniferi proceeding upwards (H H), and dividing as they go to terminate in capsules. Two of these capsules are seen on the left upper portion of the picture, at B B, while others are seen dispersed in various parts of the field. These capsules are the blind sacs in which the tubuli uriniferi (H H) end, and we may suppose that if water were injected by an Anell's syringe into one of the urine pores of a nipple in the pelvis of the kidney, the liquid would flow towards a Bowman's capsule by *t*, to fill and distend it.

Fig. 92 exhibits a magnified view of a Bowman's capsule, with its contents. The letter *a* in 92 and 91 is a branch of a small artery, which is one of the delicate ramifications of the renal artery. It enters a Bowman's capsule, and, after turning and winding in numerous convolutions within the capsule *a*, goes out as a vein *e*. This mass, tangle, or congeries of small vessels within the capsule is the Malpighian corpuscle of the kidney, and is the secretory apparatus of the organ. The urine is separated from the blood brought by these convoluted vessels to the interior of a Bowman's capsule, and when formed, or secerned, it flows forth through the excretory duct, outlet, or tube marked *h*. Let the Student trace the course of one of these excretory ducts going out from any one of the Bowman capsules, and he may follow the track down into a pyramid where numerous excretory ducts have combined to make one of the tubuli uriniferi which are marked with the letter H H.

Fig. 92.



If we consider that the Malpighian corpuscles are very numerous in the kidney—that the vascular apparatus for secreting the urine is inclosed in the little casket called Bowman's capsule, it is natural to suppose that whatever should prevent the free escape of blood entering a capsule B, or from flowing out again by H, must cause hyperæmia or engorgement, not only of the Malpighian corpuscle, which will enlarge and fill up the capsule, and so check the secerning actions there, but that the same obstruction acting on the effluent blood of the emulgent vein, must produce hyperæmia of the entire substance of the kidney, and so give rise to the first stage of morbus Brightii. How can any person doubt that the pressure of the gravid womb and of overloaded bowels lying behind the womb, must very often intercept, in a measure, the effluence of the blood that is driven into the kidney and into the Malpighian corpuscles by the emulgent artery? Or who can deny that if Bright's disease is in its first form, nothing more than hyperæmia of the kidney, a pregnant woman, more than any other, should be likely to bring on morbus Brightii? This rationale of albuminuria of pregnancy appears to me so clear, that I believe the Student cannot fail to understand it well; and if he should really understand this curious apparatus of secretion, I think he will never forget, on seeing that a pregnant woman has œdema of the feet, that she is very likely also to have hyperæmia of the kidney; that hyperæmia of the kidney is a first stage of morbus Brightii, and that morbus Brightii, albuminuria, uræmia, uræmic intoxication, amaurosis, twitchings, deafness, vertigo, cephalalgia, and eclampsia, etc. etc., are so closely allied that where the sign of one is present, the other is not far distant; and so ought to be watched, and by prudent, wise measures obviated.

The attack of convulsions has been supposed to have some connection with irritation of the nervous system occasioned by the *dilatation* of the os uteri. Possibly this may in some examples be true, yet we meet with many cases where the os uteri is fully dilated before the seizure, and not a small proportion are met with in persons who have already been delivered. Dr. Collins, in speaking upon the idea that the dilatation of the os uteri is causative of the disorder, says: "This fact might be brought forward to support the opinion that puerperal convulsions are caused by the irritation produced in the dilatation of the mouth of the womb. This, however, is not the case, as we not unfrequently find patients attacked when the os uteri is completely dilated, and all the soft parts relaxed. I conceive we are quite ignorant as yet of what the cause may be; nor could I ever find, on dissection, any appearance to enable me to even hazard an opinion on the subject."

Nevertheless, since the introduction of ether-inhalation in Surgery, and the proposal to use it in Midwifery, the anæsthetic powers of the ether and other articles employed in that way have served to shed no little light upon the state of the brain in our eclampsia: in my *Letters to the Class*, *sub voce*, I have expressed my views upon the nature of the alterations discoverable in the functions of different parts of the encephalon during eclampsia.

While I consider that the attack, or onset, is caused by long-continued or violent determination to the head, by the rapid revolution of the blood excited by pregnancy and labor, or by too intense perception of the pains of labor, I conclude that the profound insensibility ought to be regarded as anæsthesia caused by the presence of much black blood in the brain; that when the black blood grows blacker and blacker, so as to render the patient dark as an Ethiop, the convulsion is nearer and nearer to its close; that as soon as the black blood comes to deluge the cerebellum, the convulsions cease—and that, if it pervades the medulla oblongata, the patient dies from abolition of power in the sources of the vagus nerve. An individual might perish very soon from inhaling ether or chloroform, which is capable in certain persons of directing its anæsthetic force first upon the respiratory brain. But, if the respiratory brain forget in its sleep, or in its asphyxia, to cause the respiration! What then?

The author before cited, Dr. Collins, in a foot-note on p. 200, states, "that of nineteen cases recorded by Dr. Joseph Clarke, sixteen were first children. Of thirty-six by Dr. Merriman, twenty-eight were first children. Of thirty by himself, twenty-nine were first children. So that of the eighty-five cases, seventy-three were first pregnancies."

This statement is susceptible of very different interpretations, for it may lead to the opinion that the firm, elastic abdominal muscles and integuments do so press the womb backwards as to cause the obstructions to the circulation already spoken of; or it might be insisted that the said firmness of the integuments does lead to a hinderance of the flow in the emulgent veins, and so causes the hyperæmia or Bright's disease, with its albuminuria and its eclampsia. Let the Student judge for himself.

As to the frequency of puerperal convulsions, we have a tabular statement of it, which I here present, as it was printed in Churchill's *Midwifery*, edited by Dr. Condie, 1851, p. 436.

In 103,354 cases of parturition there were observed 172 cases of convulsions, by the following authors:—

	Cases.	Convulsions.
Dr. Bland,	1,807	2
" Jos. Clarke,	10,387	19
" Merriman,	2,947	5
" Granville,	640	1
" Cusack,	398	6
" Maunsell,	848	4
" Collins,	16,654	30
" Beatty,	304	1
" Ashwell,	1,266	3
" Mantell,	2,510	6
" Churchill,	600	2
" Boivin,	20,351	19
" La Chapelle,	38,000	61
" Hardy and M'Clintock,	6,631	13
Total,	103,354	Total, 172

It is curious to see how differently the run of cases occurs in the practice of the different reporters; thus, while Mad. Boivin had only 19 in 20,357 women, Mad. La Chapelle noted 61 in 38,000 cases; and while Granville met with 1 in 640, Cusack encountered 6 in 348. I know not how many labors I have witnessed, but I have met with as many convulsions as Braun saw in 24,000 labors, and perhaps nearly as many as Mad. La Chapelle found in 38,000. My private practice can bear no comparison, as to the number of labors, with that of Braun in the great Vienna Lying-in Hospital; the statistics, therefore, are of very little service in one's clinical business. If 172 cases occur in 103,000, or if 52 cases happen in 24,000, or 61 in 38,000, or 19 in 20,000, it is of little moment to the practising physician to know the grand total of labors and of convulsions; since, like Cusack, he may be doomed to treat 6 cases in 398 labors.

In the present state of the question, wherein much difference of opinion exists as to what is and what is not puerperal convulsion, or eclampsia, to tabulate the proportion of fatalities is of little advantage, since in such a table one party might prefer to include all sorts of convulsions happening to pregnant and puerperal women, whilst another party would strictly exclude everything not traceable to uræmic or albuminuric causations. I shall, therefore, omit a statement of the results obtained by Dr. Braun. I may say, however, that, of 165 cases of convulsion stated by Churchill, 45, or more than 25 per cent. of them, were mortal.

In my own obstetric practice, commenced 43 years ago, I have met many cases, both in my private and in my consultation business. ve not kept a regular record of all the cases, but the following list serve to show, at least, that I have had a considerable experience hese cases. I doubt not that the list does not comprise all the inces that I have witnessed, but I believe it to be a correct repreation as far as it does go.

he following is the list, with names and results, of the cases I have rved:—

1.	Collins,	cured.
2.	Baylle,	"
3.	Wise,	"
4.	Stewart,	"
5.	Griswold,	"
6.	Fuller,	"
7.	Farnham,	"
8.	Emerick,	"
9.	Eckert,	"
10.	Orne,	"
11.	Charnley,	"
12.	Black,	"
13.	Cambloss,	"
14.	Hill,	"
15.	Wilmer,	"
16.	Rush,	"
17.	Blight,	"
18.	Tiers,	"
19.	Lysle,	"
20.	Boves,	"
21.	Richie,	"
22.	Collom,	"
23.	Greene St.,	"
24.	Bell,	"
25.	Pine by 11th,	"
26.	Lea,	cured.
27.	Gowan,	"
28.	Taylor,	"
29.	Esther,	"
30.	Haines,	"
31.	Johnson,	"
32.	Waterman,	"
33.	M'Cauley,	"
34.	White,	"
35.	Middleton,	"
36.	Lyman,	"
37.	Walter,	died.
38.	Armstrong,	"
39.	Musgrave,	"
40.	Brown,	"
41.	Filbert,	"
42.	Smith,	"
43.	Tiers,	"
44.	Callow,	"
45.	McEwen,	"
46.	Abel,	"
47.	Sherman,	"
48.	Desilver,	"
49.	Julian,	"

hough the above list contains 49 names of which I find notes and noranda, I am sure that I have lost the memorials of several other ances. In the above recited cases there were 36 recoveries and 13 ths, or rather more than one death in every four cases. This result, ouraging as it may be, does not lessen my hope that the new light ntly thrown on the etiology of childbed convulsions will enable successors to lessen the ratio of fatalities to the number of cases, the use of those precautions against the invasion that are so well understood by many in the present day, and that would be far better understood by the world if care were taken to indoctrinate those monthly nurses, who have far better and more numerous opportunities to observe the state of pregnant women than those enjoyed by practitioners of midwifery. We, unhappily, too often become concerned in the cases only after a fatal blow has fallen on the victim, as certainly was the case in many of the above recited thirteen, whom I had no real opportunity to treat with reasonable expectations to cure them.

The disorder under consideration generally attacks suddenly, and so suddenly and unexpectedly, that like a flash of lightning or a clap of thunder in an unclouded sky, it produces a feeling of astonishment. In some instances it attacks the woman long before any signs of approaching labor are observed or expected. I have seen it occur at the 165th day of gestation, and at various periods from the 6th to the 9th month, and, in a few persons, after the complete delivery of the woman.

As the larger proportion of the cases will occur to patients actually in labor, we do not commonly observe them to fall like people affected with the falling sickness or epileptic fits. The seizures are mostly noticed in patients lying in bed, which is, perhaps, a reason why eclampsia is deemed by some quite different from epilepsy. When the fit comes on long before any labor has begun, the patient may fall heavily to the floor, as I have witnessed, while conversing with the person concerning symptoms that I looked on as prodromes of the eclampsia.

In general, when the attack begins, the woman is first seen to fix her open eyes and stare as if intently looking at some object. If spoken to she takes no notice of the speaker, but in a little while slowly and with a solemn motion turns her head towards the *right* shoulder very far round and then backwards, after which the face-muscles, then those of the shoulders, the arms, the trunk, and lastly, those of the lower limbs are violently and rapidly jerked. The eyeballs are uprolled so as to hide the cornea. The respiration is high but not very frequent, though it soon grows irregular and disordered, being attended with a quantity of foamy mucus and saliva. At first the mouth is open and the teeth quite separated by spasm in the depressor muscles of the jaw. I have always observed the tongue to be a little protruded—in a little while the jaws begin to champ or open and shut on the still protruded tongue, which is badly bitten, and bleeds so freely that the mucus and saliva of the mouth and lungs becomes reddened and flies with a hissing sound, through the closed jaws, which at last become firmly shut by a spasm so severe and so long, that it is difficult to withdraw from their bite a tooth-brush handle or stick that may have been used to keep the tongue from being dangerously cut or bruised. This champing with the teeth on the bleeding and blackened tongue, the flecks of bloody foam that dabble her person and dress; the dishevelled hair; the purple, swollen and brutified appearance that has come on the face of the most beautiful woman, giving to it an expression scarcely human; the appearance of approaching dissolution seen in her blackening countenance; in the lessened frequency and violence of the convulsive jerkings, and finally, a long protracted groan blended with râle and hissing—make it altogether the most pitiable and terrifying of spectacles. When at length the body lies still, one looks at it doubtful whether it be living or dead. The purple stains of the cyanosis soon fade before a coming paleness like that of death—the pulse is gone—the lungs are still—the victim motionless and without consciousness—we doubt if she will breathe again—yet faintly, slowly, irregularly the diaphragm begins again to draw the vital air down into the recesses of the lungs—the heart impels a feeble current into the pulmonary artery, where the life-giving oxygen combines with and brightens it: slowly it is transferred to the systemic heart by which it is sent forwards on its mission of resurrection of the brain. The innervations clear away this black darkness, and in a little while the now gentle breathings are followed by a moment of sleep, from which she wakes conscious and speaking to surrounding friends.

Under the dreadful circumstances of this disorder, one reflection ought obviously to strike the mind of the medical attendant; it is, that if the woman were not pregnant, she would not be assailed by the disease; and the inference very justly follows; namely, the pregnancy ought to be terminated in order to put a stop to the malady. For whether the assault has depended remotely on mere pressure on the great vessels, on uræmia, or on that more metaphysical state called sympathy of the brain and womb, we shall enjoy a far better prospect of rescuing the woman if she can be delivered, than we shall if the womb remains unemptied.

But can we deliver—ought we to deliver—when and how shall we deliver the woman? We can deliver if the womb is dilated or dilatable. We ought to deliver, provided we find that the discordant operations of the womb and constitution are likely to fail of promptly bringing the child into the world; for, although the womb sometimes acts with great power during convulsion, and is successfully aided by the violent, irregular, and spasmodic constriction of the abdominal muscles and other accessory forces of parturition, it also happens that the child, in some other instances, makes no progress at all, and the convulsions, returning at short intervals, afford but small prospect of escape for the patient, inasmuch as they will be likely to continue until the pregnancy is brought to a close by the delivery of the entire ovum.

It is, therefore, always desirable that the patient should enjoy the benefit of as early an accouchement as possible, but it must never be forgotten that the attempt to effect it must be regulated, entirely, by the fitness of the parts for the operation. There can be no excuse for forcing the hand into an undilatable os uteri, under any circumstances; and if the medical attendant be ever so anxious to give his patient every possible chance of safety, he will not be excusable, if, on that account, he rather adds to, than diminishes the risks of her frightful disorder, by intempestive violence in the introduction of his hand. It is true to say, that "anceps melius quam nullum remedium;" but let not this trite aphorism lead us to the commission of positive mischief, under the impression that we are about to employ a *doubtful* remedy. Happily for us, however, delivery is not the only resource to which we can appeal in our anxious wish to put an end to the danger and distress of the scene before us.

What are the circumstances of the case? The patient has, perhaps, complained of severe pain in the head; she is under the excitement of labor; she is heated; the pulse is hard, full, and bounding, and greatly accelerated. On a sudden, the muscles of the whole body become convulsed, and the patient writhes, and every feature and every gesture are horribly distorted; the respiration is attended with a hissing noise, and bloody froth issues with violence from betwixt the teeth, which are rapidly opened and closed by spasm, wounding the tongue, and giving rise to the peculiar hissing sound above mentioned. The eyes are rolled upwards, or moved in opposite directions; and after a greater or less duration of the paroxysm, the patient sinks into a stertorous sleep, or profound coma, from which she is roused only by a renewal of the convulsive movements, or to mutter in the intervals incoherent or inarticulate sounds. Here, then, we have the proofs, as they are also the results, of a preternatural development of the innervating functions of the brain and spinal marrow, caused or maintained not by uræmia alone, but by an undue momentum of the cerebral circulation. The remedy is, first, to moderate the excitement by venesection and evacuants, and, second, to remove the cause by delivery. By the abstraction of blood, we can weaken the force of the circulation of the whole system; we can make the heart beat gently, and cause it to send the blood in a milder current into the ssels of the brain; we can thus diminish the innervative function that organ, and control the muscular excitement, while, at the ne time, we abate, by the remedy, the hazard of extravasations of od in the substance of the brain, or of the effusion of water into its ntricles. If there be a case of disease in which bold and daring ployment of the lancet is demanded, it is the case of the puerperal nvulsion. It is scarcely worth while, almost, to open a vessel to aw off eight or twelve ounces of blood. The patient ought to lose m thirty to sixty ounces at one venesection, if possible; and if ns of faintness appear, they should be hailed as the harbingers of ccess. They will not appear, unless the brain is already, in some asure, freed from its state of hyperæmic tension; unless the blood no longer pushed upon it with such force as to excite it beyond asure; and if the mischief at the onset was not too great, there will a greater chance of saving the patient, provided they do come on. it this bleeding must be promptly begun, and rapidly executed. It perhaps, already too late, when the darkening countenance and livid gers exhibit the evidence of a considerable progress towards phyxiation.

While we thus endeavor by the use of the lancet to diminish the mentum of the mass of the blood, which is propelled in vast quan-ies upon the brain, we ought not to omit the use of other available ans of moderating the turgescence of the vessels of that important gan. The general bleeding should be followed, very soon, by the plication of cups to the temples and back part of the neck, and the ir ought to be cut off, so as to admit of the application of leeches the scalp, or iced water and vinegar. Sinapisms ought to be freely plied to the lower extremities, and to the abdomen; and the loca-n of them should be changed, from time to time, so as to keep up onstant irritation of some distant part, with a view of diverting the nguine mass from the cerebrum. Enemata of salt and water, or of ap mixed with water, may be made occasionally, as a further means diversion to a safer part of the body, while they also speedily un-ad the perhaps overcharged bowel. Darkness, repose, silence, should be considered essential prescriptions, in a case where so important organ as the brain is concerned, and where the slightest irritations e sufficient to turn the scale in an unfavorable manner.

Though long-continued ill health may be, in general, expected to llow severe attacks of puerperal convulsions, and, though nothing it the most constant care and watchfulness can avert many evil affec-ons, the sequelæ of a state the most unnatural and trying to which the female constitution is obnoxious, it still is true that many women are no sooner out of the paroxysm than they seem to be well again.

I shall relate some cases of puerperal convulsions that have fallen under my notice, with a view to illustrate for the Student the mode of proceeding under such circumstances. I find, in my case-book, the following entry, for example:—

CASE.—To-day (March 24th, 1851) I was called at 5 A.M. to see F., æt. 19, primipara. She had had labor pains all night. Face flushed, hands red, pulse above 100, large and hard. With every pain she had pulsating distress in the forehead just above the eye. I said to her husband that she was in danger of being convulsed in the course of the labor, which must prove a tedious one, for the os uteri, as large as half a dollar, was very rigid, the perineum excessively hard and thick, and the vertex in the fourth position.

She declined being bled, making excuses, particularly in averring that the headache was gone. At 8½ A.M., I went out to pay visits, and ordered her to be bled ten ounces at 9 o'clock, and take oil. The bleeder came, but she put him off. When I arrived again, which was 10 A.M., I had ten ounces drawn from the right arm, which let her pulse down. At about 2 P.M. the head reached the perineum, but was still not rotated. The waters were now discharged, and at 3 P.M. the vertex was got to the symphysis pubis. The pains began now to be of little force, though repeated every three minutes, and lasting about forty seconds. At 4 o'clock, I perceived her eyes fixed as in ecstasy. I spoke to her, when she made an incoherent reply, and went into a most violent convulsion. I immediately opened a large median vein in the left arm, and allowed the blood to flow until she became quiet, and the pulse had sunk very low. I got some fourteen ounces, which, with the ten before lost, made twenty-four ounces. As soon as I had done this, I cut off her hair, and covered the head with a wet, cold napkin, applied sinapisms to the legs, and ordered a salt water enema, which did not operate, she having had three dejections in the preceding night.

I also sent a messenger to Dr. Huston, and one for my forceps. Before Dr. Huston came, she had perfectly recovered her senses, but the pulse came up well, and was indeed too strong.

I applied the forceps and delivered her slowly, say in half an hour, of a son, in good health. The child was not a large one (about seven pounds). The placenta came off soon and well.

After the child was dressed, she took it and kissed it, and remained perfectly well and comfortable for more than hour, when she had a cond and most violent eclampsia, followed by apoplectic stertor, from hich in half an hour she was quite recovered.

As soon as she could swallow, I gave her thirty drops of laudanum, d after that, 16th-grain doses of tartar-emetic. She took three such ses and vomited, since which time she has been comfortable. I drew e water at 10 P. M.

25th. This morning I found her comfortable; has slept well. I ew the water again at 10 A. M., and at 6 P. M. The pulse is good, headache, and in all respects as well as I could desire her to be.

Sunday, 29th March. She has had not the least indisposition since st record, saving that I have used the catheter twice daily, being nwilling to allow her to rise to the commode.

From this time she recovered steadily, and regained her ordinary ealth.

CASE.—March 13th, 1838.—Mrs. M., first pregnancy. I was called n Sunday night at two o'clock. She lacked fifty-nine days to the ompletion of her term: was in strong labor pains, evidently of the ilating kind. They returned every five or six minutes. She was tting up in a chair, with her hands very cold, complaining of intense ain of the head. The pulse was very large, and as hard a one as I ver felt; it beat one hundred and fifteen times in a minute. In con- quence of the circumstances above mentioned, I bled her to the mount of fourteen or fifteen ounces, upon which the pulse was soft- ned, and the headache became milder. It had been most violent at e inferior occipital region, which it now abandoned in order to oc- upy the forehead, temples, and crown. Notwithstanding the bowels d been moved, I gave her some magnesia, seeing she had vomited veral times, and hoping that some alvine discharges would assist in lming the violent disturbance of the circulation within the brain.

In the morning she got an enema which operated freely, yet the eadache continued to be severe, and the pulse somewhat tense. here was not a great degree of heat, and I expected to find a dimi- ution of the vascular excitement from a severe flooding, which came n at eight o'clock. At nine A. M., the os uteri was about the size f a dollar, hard and unyielding.

At twelve o'clock, my patient complained of *severe* pain in the head, nd said to me, "I can't see you; I feel quite confused." As soon s these symptoms were made known to me, I was fearful of the ap- roach of a convulsion, and immediately proceeded to tie up the arm; ut before the blood began to flow from the vein which I opened, he had a most violent convulsion. I allowed the blood to flow until the pulse became reduced, and then the convulsion went off. I did not take more than eight or ten ounces, which was a very small quantity, in view of the effect to be produced, and actually produced by the operation. Sinapisms were applied to the feet. Mrs. ——— remained in a state of insensibility for twenty or thirty minutes after the disappearance of the couvulsive movements, and then recovered her senses. She now had a considerable flooding, which continued to trouble her during the morning.

As soon as the spasms ceased, I ruptured the membranes, and the fœtus, which was dead, was expelled at half-past twelve o'clock. It was living at seven in the morning.

She had no more spasms or convulsions after this, but the pain, like a *clou* (or nail in the head), was so violent that I ordered leeches to the temples in the afternoon, and gave her a proper dose of salts and magnesia. The pulse continued to abate of its violence regularly. The medicine operated freely; but at seven o'clock the following morning, she was leeched again on account of pain in the head, and was perfectly comfortable from that time. This woman was dressed, and walking the floor within four days after her accouchement, and continued well.

As regards this case, I presume any one of my fellow-practitioners would readily say that it was well managed, notwithstanding the smallness of the second bleeding, since I resorted early and promptly to the use of proper remedies. I conceive that the resort to venesection in the first visit was highly expedient, and though it did not ward off the threatened convulsion, it doubtless mitigated it, and rendered it more manageable by the subsequent treatment. The only real resource in the puerperal convulsion is in the use of the lancet; and the rule ought to be established that a woman is menaced with convulsions, if she is affected with headache near her term, especially if that headache be referred to the crown, or to some point (clou) that could be covered with the end of the finger. I intend never to hear such complaint without pondering upon the value of the indication it throws out, namely, that the lancet, the lancet, and nothing but the lancet, is worthy of confidence. I shall make these same reflections in similar circumstances of pregnancy even when not advanced beyond the sixth month, having lately had occasion to witness a desperate attack in a young primipara five months gone in her gestation.

CASE.—March 13th, 1838, called to Mrs. ——— at six o'clock this evening. She was sitting in her parlor. She expects her labor every hour, the time being out.

I said, "How d'ye do?" "I feel weak," she replied. "I cannot see more than half of anything I look at; I can only see one-half of your face: I can see only one of your eyes." I asked her to cover her right eye with her hand. "Can you see the whole of my face now?" "No!" "Cover your left eye; can you see properly now?" "No; I can see only half." "Have you any pain, weight, or dizziness of the head?" "No!" "Any sick stomach?" "No!" "How long have you been so?" "About half an hour!" "Were you ever so before?" "No!" "Any numbness or want of feeling in the hands?" "No: but my hands are cold." The pulse was about eighty-five, and a little tense, yet moderately so. The bowels not bound. This was the amaurosis of a coming eclampsia.

She now went up stairs, and I took four ounces of blood from the arm, having bled her eight ounces six days ago: when I had bled her, she could see the whole of my face, or the whole of any object she looked at. She did well in her lying-in.

It is a curious circumstance, and one well worthy of attention, that the blackening of the blood, or its conversion into venous blood by the interruption of the respiratory or oxygenating function, should be the means ordained and designed by Providence for the cure of the paroxysm. When the whole sanguine mass has become carbonated, the brain and the spinal cord must cease to innervate the muscles convulsively; and the speedy relaxation of every rigid muscle permits the restoration to the lungs of their oxygenating power; so that, in a few moments after the countenance has been black and deformed in every feature, we have the pleasure to see it, though ghastly pale, recover its whiteness; while the brain, I mean the whole brain, wakes up to the renewed performance of its organic as well as its intellectual offices. When, therefore, in looking upon these frightful scenes, you see the face of your patient growing darker and darker, you will discover in that very circumstance the hopeful announcement of a speedy close of the distressing exhibition.

I think that, in a majority of cases, you may expect to find the whole brain recover soon after the ceasing of the convulsing innervations; but this is not always the case; for, in some patients, I have noticed a profound coma to succeed the convulsions; the hemispheres, the cerebellum, and the tubercula quadrigemina, remaining oppressed and extinct, as to their power, while the medulla oblongata and the spinal cord had resumed a quasi regular exercise of their forces.

CASE.—In a case that fell under my care in this city, a few years since, the lady had convulsions, which occupied the hours from about

11 o'clock A. M. till near 5 P. M. During these convulsions, she gave birth to a dead fœtus of the seventh month; remaining wholly unconscious during the whole process. I say unconscious, though she moaned a little, during the labor pains, like a person disturbed by some distressing dream, or like one under the influence of ether in a surgical operation. Some hours after the last convulsive attack, and after she had been lying profoundly still, as if asleep, she moved with spontaneous or voluntary motion; showing that the cerebellum was aroused to its true office of directing or co-ordinating the power extricated by the brain and spinal cord. She soon afterwards spoke, and recognized the voices of friends and was perfectly reasonable; showing that her hemispheres had waked up to their office of intellectual perception and combination. After having for some time spoken, and spoken well, she said, "How dark it is—why do you keep it so dark?" "It is not dark," replied I; "do you not see the candle?" "O no; there is no candle here." "Yes, dear Mrs. ——, here is a candle; see—I hold it just before your face." Her beautiful eyes were open, and she turned them at will, to look for the light which shone into their large dark pupils. "Do you not see the light?" said I, again. "O no, Doctor, why do you say so? I'm sure there's no light here." She was totally blind—amaurotic—that is to say, her tubercula quadrigemina were still oppressed, while the rest of her brain had recovered, being liberated from the congestion-thraldom of the black blood. She had amaurosis from pressure on the tubercula quadrigemina. After some time, the dawning light of day having considerably increased, she perceived it through a window opposite, and cried out, "Why, it's daylight!" and I then knew that the tubercula quadrigemina was also recovered and her amaurosis gone.

There is a useful moral in this statement;—it is that we should look to it, in the conduct of all such cases of disease, that all the parts of the brain shall recover—and that, in so far as our measures may have efficacy, we fail not to employ them to the entire subduction of even the last vestiges of morbid action, or oppressed or suspended power. These vestiges of disease we may clearly discern in the intellection, and in the muscular innervations and co-ordinations.

The successive recovery of the different parts of the brain in this case is interesting, as it is analogous to the incidents observable under etherization. When a patient is subjected to the inhalation of ether, the different parts of the brain are affected in succession; but not always in the same succession. The sensitive cords of the cerebro-spinal axis are, in etherization, plunged into a state of insensibility—

leaving the hemispheres capable to perceive and understand what the quadrigeminal tubercles see of any operation that the surgeon is performing. Or, the motor fibres are put asleep, yet the sensitive ones communicate to the conscious mind the painful impressions which the mind perceives—but which it forgets, as it forgets a painful dream.

If the etherization go very far, the hemispheres, the cerebellum, the tubercles and the motor and sensitive cords, are all alike hushed in a state of profound aperception of both the direct and the reflex impressions; the medulla oblongata alone continues to do its work of irradiating the parts that are under the control of the pneumogastric, if the ether be given long enough, and in quantity sufficiently great to quell its force of innervation also, the patient dies. Hence, the medulla oblongata is called by M. Flourens the life-tie, the vital knot, *le nœud-vital.* The oxygenating power depends upon it, and without oxygen there can be evolved no neurosity. Take away the ether in good time; admit the pure atmosphere to the lungs, and the functions of the whole brain are revived; so, in our eclampsia, as soon as the abnormal state of the encephalic circulation gives place to a normal, or one more nearly normal, the brain wakes up to its duties again, and the patient sees, hears, speaks, and acts with the most perfect co-ordination of all those vital forces that are dependent on the brain and cord.

If, in etherization, we press the administration of the drug to the point of overwhelming the medulla oblongata, she will die, and we shall find no necroscopic lesions in the encephalon. So, likewise, in the speedy dissolution under eclampsia puerperalis, the autopsy discloses no lesion of any part of the brain. She dies because the medulla oblongata is asleep or asphyxiated. Are we surprised that the woman should die without perceptible physical lesions of the brain? We are not at all surprised if she discloses none such when destroyed by ether-inhalation. May not the brain perish under the one influence as well as under the other, and yet, dying, leave no sign? In eclampsia, there is always abolition, for the moment, of the power of the hemispheres, always of the tubercula quadrigemina, and always (perhaps!) signal change in the cerebellum. All these revive, and are extinguished again and again, as the paroxysms are repeated or suspended by turns, provided the medulla oblongata perish not. When the case has come to its close, and the patient is restored, where are the lesions? No trace of them remains. But—and here is the explanation—if the sleepless medulla oblongata be affected equally with theothers, the patient dies, because the sources of the respiration are cut off. To breathe is to live. God breathed into Adam the breath of life, and he became a living soul.

CASE.—In 1841, I attended Mrs. S. R. during her first pregnancy. She was about twenty-two years of age—a short, but stoutly made woman. She was about six months gone with child when I was first called to see her, having been recommended to me by a medical friend, who declined to take charge of her case, supposing her to labor under disease of the heart, which rendered her situation so extremely precarious, that my friend had cause to apprehend she might die in labor, from the exertions she should then be called upon to make. There was already great œdema gravidarum; and slight muscular effort in moving about her apartment served dangerously to augment the respiratory and circulatory embarrassment. I shall cite from my work on *Females*, a notice of this case, which I am desirous to present to the reader of this volume. It may be found there, together with other observations on anæmia in pregnant women, at page 505.

"She presented all the appearances of great dilatation of both the auricles and ventricles of the heart—the impulse of which was perceptible to the right of the middle of the sternum. The pulse, except when she was in a state of recumbent rest, was large, gaseous, unsteady, and very sudden. The face and whole surface were pale and flabby, the cornea nearly uncovered by the upper palpebra. The respiration was troubled, and on the least motion or emotion, became precipitate and difficult. At the end of the seventh month, the lower limbs became considerably infiltrated, and the power of muscular motion much curtailed in consequence of its being always attended with violent beating of the heart, breathlessness, and uneasy sensations in the head, as pain, vertigo, noises, and dimness of sight.

"The progress of the pregnancy was accompanied with aggravation of all these appearances.

"On different occasions she had attempted to walk in her house, and had fallen on the floor in a state of insensibility. I, being hurriedly notified of such an accident, arrived on one of the occasions, at the house, soon after she was taken up from the floor and laid upon the bed.

"I found her absolutely pale, scarcely able to speak, and completely blind when I arrived. She knew my voice, and opened her eyes to look at me as I spoke;—the eyes were bright, the pupils natural, but she was wholly without sight. She complained of some degree of fulness of the head. The pulse was still agitated. In a short time the sight returned, and was perfect as before. I do not recollect how many times she actually fell in this manner, and with such following phenomena, but the accident was repeated several times. In nearing the term, the swelling of the limbs from œdema was greatly augmented, so as to affect the thighs, and the buttocks, and labia; the pericardium became also the seat of a dropsical effusion, so that complete orthopnœa soon declared itself.

"My patient could not lie down day or night. If she sat up with pillows against her back and shoulders, the oppression became so dreadful, she was obliged to throw them away; but, requiring some support, she placed her back against one of the posts at the foot of the bed; leaning against the slender cylindrical bedpost, she could find the needful support or rest without the oppression brought on by pillows or cushions. Here she sat day and night for many days, with very bad thin blood, which was imperfectly oxygenated, and so, greatly increased the disorders of the innervation. Her condition was truly deplorable, and it was difficult to imagine that the heart could ever recover its form, consistency, and power, should she even escape death in the impending conflict of labor. In fine labor came on, and in due time I delivered her with the forceps in order to save her from the necessity of exerting any voluntary force."

This young woman is now in the enjoyment of perfect health, having since given birth to several children, without any accident or extraordinary trouble whatever. Nor does she at present labor under any disease of the heart. Was this state of things brought about solely by nephritis albuminosa?

CASE.—Many years ago, I had charge of the case of Mrs. F. B., who was at that time the mother of two children and had been in delicate health since the birth of the last one. She came under my care during the last sickness of a medical friend, who had treated her many months as laboring under disease of the heart. To rise from her bed, and take a seat upon the sofa, was sufficient, on may occasions, to develop signs of approaching asphyxia from the disordered circulation consequent upon even the most moderate muscular exertion. I frequently observed the respiration and the heart's action to be so violently disturbed by these moderate efforts as to excite my serious apprehension of her imminent death. The pulsations of her heart were as well discoverable far to the right of the sternum, as in the left side of her chest. She was deadly pale; her lips swollen and blue; and to lay the expanded palm upon her breast was to discover under it a quaking and a tremulous motion like that perceived upon pressing on a quagmire. After a long treatment, her health amended somewhat.

She conceived, and proceeded with doubt and difficulty to the term of her utero-gestation. I confidently expected she should perish in her approaching labor, during the greater part of which she was obliged to be raised against pillows on account of a distressing orthopnœa. As the labor drew very nigh its close, it was necessary for her to take a lower recumbent position for the greater convenience of her delivery. I expected consequently, during the progress of her labor, to find her convulsed, and in fact the crisis which was brought about by the last uterine contraction, and the final strong tenesmic effort of expulsion which brought her infant to the light, was instantly followed by a short but most frightful convulsion, which, as it retired, left her apparently moribund. Somehow,—I know not how,—yet by the spontaneous powers of the constitution, she revived from this condition, and had no further serious trouble during her lying-in. In fine, this lady recovered a state of robust health. Her vast dilated heart, which seemed to me as large as a quart measure, regained its normal generical magnitude and force, so that, a few years afterwards, when I visited her sick daughter, she ran before me as light as a girl up to the fourth story of the Washington Hotel, without drawing a long breath on reaching the top. Her heart, I feel perfectly assured, was sound and well again. Was it morbus Brightii? If it was so—in what stage of the disease? This was a case of anæmia gravidarum, and the labor was preternatural, for it was orthopnœic, and it was followed by a terrific convulsion.

With regard to the treatment of labors rendered preternatural, by aggravated degrees of anæmia, I have only this counsel to give to the Student: 1. That he should clearly disclose to the friends of the patient the whole extent of the perils by which she is surrounded, while he gives to herself the reasonable assurances of his hope to conduct her safely through the whole course of her labor. 2. That, in the Conduct of the case, he should take all possible precautions to avoid undue excitement of the nervous and vascular systems, forbidding the bystanders to exhort her to bear down, and frequently advising her to bear her pains patiently, waiting for their dilating effects, and so continuing until the presenting part, having come within reach of the hand or the forceps, may be gently drawn away almost without any spontaneous assistance of her own. If there can be found a case in which the power of the forceps can be deemed more beneficent than in another case, it is that in which a parturient woman, with an immensely dilated heart, useless valves, with cellular infiltration, and serous effusions within the chest, has barely power to live, but not enough both to live and expel the child from the womb.

It is true that the woman may be greatly infiltrated in pregnancy rithout having a dilated heart, and that such infiltrations readily disppear after the birth of the child; but they mostly leave the patient pale nd chlorotic—or, in other words, hydræmic. I shall think that the roman excessively affected with œdema gravidarum should always be eld to be threatened with relaxation or flabbiness of the muscular bres of the heart, and the thereupon dependent disorders of which I ave spoken. In order to overcome the œdema, it might in some ases be necessary, and no doubt is often effectual, to draw blood from e arm, to regulate the diet carefully, to entertain a soluble state of e bowels, and more than all these, to command the patient for a reek, or more than a fortnight even, to take an unintermitted horiontal rest upon her bed or couch. To rest for a long time, and in oing so to avoid the dorsal decubitus as much as possible, is to put a op to the progress of the infiltrating secretion, which I believe in ue œdema gravidarum always begins and ends in the most dependent arts—to wit, the feet and legs. The circulation in such a posture ecomes more and more moderate, and the aqueous humor already ffused, being now dispersed almost over the whole of the subcutaeous cellular tela, is imbibed by thousands of absorbing orifices, to hose action it could never be exposed while accumulated solely in e lower part of the trunk and in the inferior extremities. I condently recommend this mode of treatment, and assure the Student at I saw a young lady, a primipara, in October, 1848, who was five onths past gone with child, in whom the œdema gravidarum had disnded not the legs only, but very much also the pudenda: in this case e whole of the dropsical effusion disappeared in some ten days of a orizontal recumbency which she observed in consequence of my remmendation. These dropsical effusions should not be regarded by e Student as signs of an hydropic diathesis, but rather, as I have sewhere explained, as the results of mechanical pressure and obruction upon veins and absorbent trunks. Where the œdema has ecome very great, and the anæmical condition aggravated, there ises a real hydropic tendency or diathesis which leads to effusions to the belly or into the chest. As to the advice to draw, on certain casions, blood from the arm of the hydræmic patient, I do not find am inconsistent with myself: it is to be remembered that the hyræmia is in this case produced by a pathological state of the hæmasic tissues, and that to bleed is, in some cases, to cure that malady.

Common experience and observation show very clearly the proriety there is, in all those cases where the anæmia has become thoughly established, to prescribe for the patient the use of ferruginous tonics. It is scarcely necessary for me to repeat, in this place, that the article most suitable for the occasion is the metallic iron of M. Quevenne. It may be given in doses of two grains in the form of a pill, to be taken immediately after meals three times a day.

Exhaustion.—Labors are sometimes rendered preternatural by the occurrence of what is called Exhaustion. Any disproportion between the child to be born, and the straits or the excavation of the pelvis, might, by protracting the vain efforts of the woman, serve to exhaust her forces. The disproportion may be absolute or relative. The child may be preternaturally large, to that degree indeed as to make it impossible for it to pass, unreduced in magnitude, through the parts; or the child may be of the normal size, while the pelvis is of under size, though in other respects well fashioned. Again, both the child and the pelvis may be duly proportioned to each other; yet the child may so present itself to the passages, as to retard or render impossible its spontaneous exclusion. Thus, if the child should present its head in extension at the superior strait, and descend in face presentation, with its chin to the sacrum and its forehead to the front of the pelvis, it would prove a very extraordinary circumstance should the woman fail to fall into the state of Exhaustion, unless delivered by the hands of the accoucheur: or there might be a departure of the chin from the breast; or such an occipito-posterior position of the head as to cause the two extremities of the occipito-frontal diameter to become immovably fixed upon opposite surfaces of the pelvis, constituting what is called arrest, and ultimately impaction of the cranium. An unturned or unevolved shoulder presentation; a prolapsion of a hand or a foot along with the head; or the impaction of the parts of two children at the same time in the pelvis, might serve to exhaust the expulsive as well as the vital powers of the woman. In addition to the above causes of this kind of preternatural labor, we ought to mention rigidity of the vaginal cervix, whether simple rigidity, or whether rigidity arising from carcinoma, or the remains of uncured inflammation of the os uteri. I have found that the action of the womb may be contravened by the intrusion of a loop of intestine betwixt the front aspect of the womb and the contracting abdominal muscles, occasioning during the labor throe, such great pain in the prolapsed loop of intestine, by compressing it between the hardened globe of the uterus and the contracting abdominal muscles, as to overcome the proper conformableness of the innervations *ad partum.* It is scarcely necessary for me to enumerate all the possible causes of exhaustion in labor; it is better that I should say that the parturient action of the uterus and accessory muscles is effected at a certain expense of power developed in the nervous mass of the patient, and that while a woman in ordinary labor, and even in severe and long-protracted labor, is generally found capable of evolving from her nervous mass and sending down to the uterus and adjuvant muscles, an amount of innervative force sufficient to enable them to overcome all obstacles, yet obstacles are in some instances so rebellious that the sources of the nerve streams become exhausted, and the cerebro-spinal axis refuses any longer to repeat vain attempts to deliver; the woman lying motionless, feeble, and in a state which, to be truly denominated, should be called exhaustion, or the commencement of the moribund state. Exhaustion does not mean fatigued, but it means constitutional irritation of the most dangerous sort.

The heart has lost its force and increased its frequency, for the sources of its innervation are greatly diminished, and its own physical structure has become changed in impressionability and power. The respiration is hurried and short, for the diaphragm, the respiratory piston, makes short strokes frequently repeated—its power being nearly done. These states of the respiration and circulation necessarily involve disordered and diminished evolution of life-force in the nervous mass, and the blood, the fluid body, becomes fatally changed. Let the Student take heed, therefore, of the beginnings of exhaustion, for she who has gone far into it is irrecoverably gone into it. It is exigent to deliver her, and that in the manner least likely to consume her feeble remains of life power. Exhaustion is preternatural in labor, and even if it were not so, the duty becomes incumbent on him to render the labor preternatural by delivering with the vectis, the forceps, or the embryotomy forceps. Let him bring the chin to the front of the pelvis; or let him use the vectis; or let him reduce its magnitude with the perforator, in order that the child may be born; or let him extract it with the forceps. Let him, where there is departure of the chin and consequent impaction, restore the chin to the breast, or convert it altogether into a face presentation; let him convert the occipito-posterior into an occipito-anterior position; let him return the prolapsed arm above the head; let him put away the foot, and give space for the head to descend through the pelvis; let him turn and deliver by the feet, or promote the spontaneous evolution of the fœtus; let him disengage the prolapsed loop of intestine from betwixt the womb and abdominal muscles; let him reduce the size of the hydrencephalic head of the fœtus, in order that it may pass the straits; let him take away from the woman any further necessity to evolve biotic force for the expelling womb and abdomen; let him take away from her agonized nervous mass all further occasion to perceive the irritation, the pressure, or the pain; and then, tenderly placing her upon her pillows, wait until perchance her blood may be redeemed from its perilous disorders, and her neurine again come to send down its streams of biotic power to all her organs and organisms, with a gently increasing, conformable, and normal power.

There is a great difference between exhaustion and the mere cessation or suspension of labor pains. The woman may fall into labor, and after proceeding many hours towards the accomplishment of her delivery, she may stop for many hours to commence again, and again to cease the work of expulsion. The act of labor being established, does not necessarily imply that the effort shall be continued until the completion of the process. A woman may be in labor during several hours daily for a whole month, dilating her os uteri to the size of a half dollar, and then closing it again so that it shall become as small as before the commencement of the process; so a woman, even in advanced labor, may cease to labor for hours, or for many days, and yet suffer no perceptible illness. Such a case is not sickness. It is not exhaustion. Hence, I warn the Student that he ought not to commit the serious mistake of concluding, merely from the cessation of the pains, that the woman is in a state of exhaustion, or even beginning to fall into that dangerous state. I know not why it happens, as it often does happen, that labors begin and stop without any apparent indisposition; but I know that the records of a man's practice should furnish him with many instances of the kind.

To know the state of real exhaustion, let him look upon the condition of the vital triad—the brain, heart, and lungs; or, in other words, the innervative, the circulatory, and the oxygenating functions. He will discover the condition of the brain by the psychical signs, such as illusions, hallucinations, delirium, altered temper; and by the physical signs, loss of co-ordinating power in the cerebellum, seeing power in the quadrigeminal tubercles, respiratory power in the indispensable respiratory bulb, and lessened intensity of the nervous force in general. The embarrassment of the circulation is discoverable by lessened power of systemic injection, and augmentation of the frequency of it—the oxygenation shows its failure by change of temperature and of colorific power, all of which must be studied, and profoundly studied and understood, in the manifest action of the mind and the whole physical conduct and aspect of the patient. In a difficult labor, tending to exhaustion, there will first be discoverable a most marked violence in the effort of the arterial pulse, which becomes voluminous, hard, and frequent—beating about 110 pulses per minute.

Whenever, after some time of protracted and fatiguing efforts with such a state of the pulse, the contractions of the heart are found to be repeated 120 to 140 times a minute, the volume of the artery becoming reduced, the temperature being also lessened, with a dry mouth and parching thirst, loss of courage and resolution on the part of the poor woman, the presenting part in the mean time making no progress whatever, exhaustion has begun, and has already proceeded even too far.

Exhaustion is not likely to arise from the resistance of the soft tissues only. Even the most rigid cervix uteri gives way when the strength begins to go down. So also the most resisting perineum yields before the constitutional force is abolished or overthrown. But the impacted head, the unturned shoulder, or the impracticable pelvis, can never give way; and the efforts of the nervous, circulatory, and oxygenating forces must ever fail in presence of inexpugnable resistance: in such instances, the sources of the innervation must sooner or later become wholly exhausted, and the woman be lost if she be left to the powers of her own constitution.

In the beginning of exhaustion, to deliver is to save the mother. A too long procrastination of her deliverance is most apt to insure her death.

Exhaustion not being likely to ensue in consequence of soft resistance only, we have, even in the most obstinate cases of soft resistance, little to fear from contusion and a coincident irritation or shock; nor have we ground to look for dangerous sloughing at a later period. But when exhaustion arises from vain attempts to overcome the resistance of solid bone, we have, in addition to the direct effect of such efforts in vitiating the blood and modifying the crasis of the nervous mass, much mischievous impression upon the whole nervous system, radiating from parts engorged, contused, or ruptured. The violent excitement of the sanguiferous system, in painful protracted labors, serves in a sense to demolish the organization of the blood, which becomes broken down, its plastic portion being increased excessively, while it loses in a measure its sensibility to the action of oxygen; it loses, in other words, its healthy crasis and the innervative results of its oxygeniferous force; and its contaction with the nervous mass become unconformable to the wants of the organs, which fail and die under such want.

Cramp.—I do not remember to have met with any published statement of cases of cramp in the legs as causes of Preternatural labor, and yet, having met with examples of it in my own practice which rendered the use of forceps absolutely indispensable, I have thought fit to relate them in this book. There is no need for great surprise at the announcement of this cause of preternatural labor, since it is well known that the compression or tension of a nerve may give rise to pain so great as to disturb in the most violent manner the functions of life. The head of the fœtus, in descending, may be impelled with so great a degree of force against certain of the internal sacral nerves as to render the patient almost or quite frantic from the agonizing sensations developed thereby. Under such intense suffering, the womb may cease to act, or act inefficiently, and the practitioner, seeing that the distress of his patient is greater than she should be permitted to bear, hastens to extend to her the only prompt and efficient means of relief.

Without further discussion of the reasons which, *à priori*, should include the violent cramps to which I refer among the causes of preternatural labor, I beg to refer the Student back to page 48 for accounts of the cases, which I have no occasion to repeat in this connection.

Prolapse of the Cord.—There are other circumstances that may suffice to convert a natural into a preternatural labor. Among these may be mentioned the prolapsion of the umbilical cord. The cord very rarely gets down below the presenting part of the child, and we have reason to be astonished at the rareness of the accident when we consider the great length of that part of the secundines, which is sometimes found to be six feet in length. The mere falling of the loop could not, under any circumstances, interfere with the ability of the woman to deliver herself, because it could not inconveniently occupy any space in the pelvis to the hinderance of the birth. The importance of the accident is relative only to the child, and not to the mother. The child is placed in imminent danger of dying by asphyxia from pressure on its umbilical vein and arteries when they fall below its head in labor. Hence, the necessity of expediting the delivery by manual or instrumental means, and the conversion of the natural into the preternatural kind of labor, either by turning or the forceps.

I do not wish to be understood as advising a resort to art as an invariable rule of practice in such cases; for it fortunately happens, in some instances, that the pelvis is large and roomy, the os uteri dilating rapidly, and the pains sufficiently strong to assure us that the child will be born so speedily by the unaided powers of nature, as to make it unnecessary for us to interfere. The child has so good a chance for escaping uninjured, in a rapid delivery, that it is more advisable to confide in that chance, than to expose both the woman and the child to the hazards of a forced delivery. I repeat that it is a rare occurrence to meet with a cord prolapsing, after the labor is fairly begun. Indeed, the head so completely fills up the cone of the cervix uteri, as to prevent the navel string from falling down betwixt the head and the walls of that cone. If we find it fallen down, therefore, and the os impracticable, what madness would it be to attempt to turn before the cervix is dilated! Such an attempt would be likely to fail, or kill the patient. But if the os is dilated, and the head on the point of escaping into the vagina, we may expect, as soon as it has cleared the os, to be able with the forceps to rescue the infant, and that with almost no risk to the mother. We also have the advantage of being able, by touching the prolapsed cord, to ascertain the state of the fœtus: if the pulsations continue vigorous, we shall suppose the child to be doing well, and if they become faint and feeble, we shall be led to resort to the forceps or to turning, as the case may be. When the prolapsed cord has no pulsation and is cold, the child is dead, and of course no steps need be taken on account of the prolapsion, which, in that case, becomes a matter of indifference. These prolapsions rarely take place after the mouth of the womb has become well dilated. The cord is probably down, in most cases, before the labor begins, for it is found protruding through an os uteri not larger than a half dollar. Such an os uteri is impassable to the hand; therefore the accoucheur can by no means return the fallen cord into a cavity to which he cannot have access: he makes vain attempts to succeed by pushing the loop back within the constricted circle of the mouth of the womb, from which it again immediately escapes. If he could carry the string quite above the head, it would stay there. It is evident, therefore, that, with the hand alone, little success can be expected, in even the most patient endeavors to get the prolapsed part in a place of safety. I have succeeded with my hand alone, but have much more often failed.

Many various methods of repositing the cord, or putting it back into the womb, above the fœtal head, have been proposed; they have mostly been found ineffectual, from its being apt to fall down again, even after it has been put into the proper place. I have never yet had an opportunity to try a method which I beg leave to propose to my readers, and which is as follows: Take a piece of ribbon or tape, a quarter of an inch wide and four or five inches long. Half an inch from the end, fold the tape back, and sew the edges so as to make a small pocket. Then fold the other end in the opposite direction, and sew that also, to make a pocket of it. Now, if the cord be taken in the tape, and held as in a sling, a catheter may be pushed into one of the pockets, and that one thrust into the other, so that we shall have the cord held as in a sling, which is itself supported on the end of the catheter or womb-sound. Let the catheter be now pushed up into the womb, beyond the fœtal head; it will carry the secured portion of cord with it, and the catheter being withdrawn, the tape is left in the uterine cavity, where no harm can be occasioned by its presence. If required, several such tapes could be secured round the cord, and all of them fixed on the end of the same catheter, and pushed at the same moment far up within the cavity of the womb. By using this method, Dr. S. P. Browne, of Greensburg, in Westmoreland County, Pennsylvania, succeeded in separating the umbilical string, as did also his son, Dr. Robert Browne.

Fainting.—Fainting or syncope, when often repeated in labor, is sometimes of so alarming a nature as to induce the practitioner to be willing to expedite the birth of the child, in order to put an end to so threatening a symptom. No prudent person, however, would be led to perform so serious an operation as Turning, or the application of the forceps, without being first fully convinced of its necessity. Of the degree and imminency of the danger here, none but a medical person can be supposed a competent judge, and the case must be left in his hands, strengthened, as he should be, by the counsel of a professional brother. I shall feel satisfied, therefore, to have merely referred to this cause, and to leave it to the discretion of the attendant physician, without any additional remarks.

Hernia.—A hernia, especially if of a kind liable to strangulation, might be a warrant for the accoucheur to hasten the moment of relief by the employment of the resources of art. We have also, in a few very rare instances, the dreadful accident of laceration of the womb or vagina to contend with. Of course, as soon as either of these accidents is known to exist, we should resolve to take the management of the delivery into our own hands, in order that we may, at least, save the infant, while we can also offer some faint chances of hope for the safety of the patient.

Engagement of a Loop of Intestine in front of the Womb.—Though the gravid uterus, at full term, lies behind the abdominal integuments, and quite in front of the mass of intestinal convolutions and transverse colon and its sigma, it sometimes happens that a portion of the mesentery or mesocolon, I know not which, becomes so relaxed or elongated in the direction of its radius, as to permit a considerable portion of the intestinal tube to fall over the front aspect of the womb, and, when once engaged there, to be driven down by the expulsive force of the belly, as low as, or even lower than the umbilicus, where it is pinched, or compressed, or perhaps in a sense strangulated, by the contraction of the abdominal muscles in the labor throes. The Student will readily conclude that so distressed a condition of an important organ could not but introduce modifications in a labor. In such a case, his attention will be drawn to the extreme suffering of his patient during her pains, which, instead of propelling the child rapidly, as might be expected in view of the intenseness of her distress, cause it not to advance even one tittle; while cries, jactitation, and the most disheartening expressions leave him at a loss to imagine the cause of delay, the more particularly when he finds not, in the position, the presentation, or the state of the soft parts, causes that might arrest the progress of the parturition. He ought to inquire as to the existence of such possible causes, and if he find them not by his vaginal exploration, let him ask questions as to the place and kind of pain, and he will discover that the woman has intestinal pain, and that that pain is situated between the womb and the integument.

CASE.—Without making further special observation on this accident, it will suffice me here to say, that, about fifteen years since, I was in attendance upon a primipara lady occupying a high social rank in this city. The labor had proceeded without any untoward circumstance to almost complete dilatation of the cervix uteri, when my patient began suddenly to complain most unaccountably of her pains. She became excessively agitated, and being a person possessed of great self-control, I was much astonished and alarmed by her moans and agitation. I could discover in the condition of the presenting parts and the textures within the pelvis, no grounds of great distress; but after careful inquiry, learned that the pain was in the uterine tumor, just above the umbilicus. She had not been affected with rheumatismus uteri during her gestation or the antecedent part of her labor; I was obliged, therefore, to fall back upon the painful apprehension that the texture of the uterus was about to give way at the seat of this pain, for that is what the practitioner ought to apprehend under such circumstances. Approaching the lady's bedside, I requested permission to examine the abdomen, for which the nurse prepared her by uncovering her of all save the under garment. Upon touching the abdomen, I found an irregular eminence in the place complained of. Gently percussing it, I discovered from its sonorousness that it was a loop of intestine fallen down there, and which, being compressed between every uterine and abdominal contraction, had given rise to the agitation and pain. As the integuments were thin, I was enabled by a sort of taxis to push the loop upwards from its dangerous position, whereupon the labor pains became again normal, and the parturition thenceforth proceeded steadily and towardly to a happy conclusion. I have never met with a similar example. This was altogether an unnatural state for a woman in labor, and therefore I consider this woman's labor altogether a preternatural one.

Carcinoma Uteri.—Carcinomatous degeneration of the cervix and os uteri does not, unhappily, always obviate the power of fecundation and conception. A lip of the os tincæ may be far gone into carcinomatous degeneration without exciting suspicious discharges of mucus, sanies, or blood, and even without developing such a degree of sensibility of the part as to preclude cohabitation. The development of heterologue tissue in the cervix uteri is, in some instances, as slow and torpid as the development of similar tumors in other parts of the body. To become pregnant under such circumstances is a great misfortune indeed, for gestation changes the whole life-activity of the uterus, which becomes altered in form and density, and fatally tends to augment the heterologue life which has established itself upon the vaginal portion of the organ. Hence where the torpid and sleepy carcinoma takes upon it the life of the open cancer, and the fœtus has attained its full growth, and labor has begun, let the Student imagine the awful condition of the patient, one-half of the circumference of whose cervix uteri has become a mass of heterologue tissue, filled with the caudate cells and silvery bands of the cancerous mass, utterly unsusceptible of dilatation, and exquisitely sore and painful. If such a womb should ever be opened, the dilatation of the mouth of it must be effected at the expense of the unaffected half, its only dilatable portion. If the circle of the os uteri must in labor become a circle of twelve or thirteen inches in circumference, in order to permit the escape of the head, what must be the unspeakable agony of the patient, half the circumference of whose os uteri has become perfectly undilatable through carcinomatous degeneration?

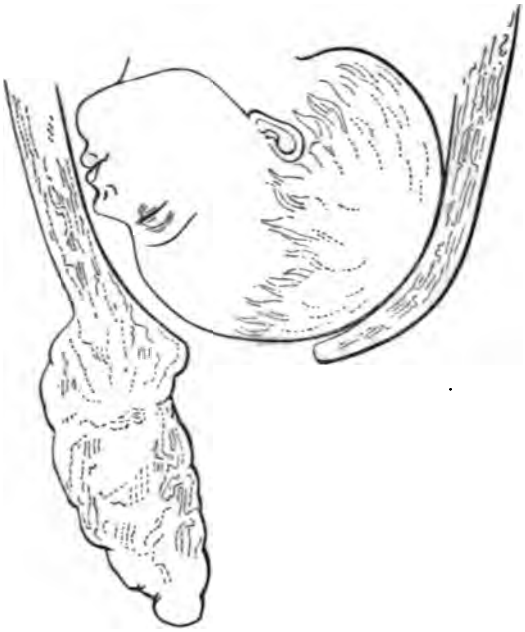
CASE.—I saw, in the early part of the year 1847, a wretched human being, whose cervix uteri and vagina, the seat of a frightful ulcerated carcinoma, had just been torn to pieces by the escape of a full-sized fœtus at term.

CASE.—On the 18th of March, 1848, I was called at 11 P. M. in consultation, to a pregnant lady. She was thirty-three years of age. She has not had a child during the last fourteen years, having previously given birth, I believe, to two children.

Throughout the whole course of the present gestation, she has suffered with distressing, most distressing, nausea and vomiting. She is pale and emaciated. Has had frequent bloody vaginal discharges from the beginning of the pregnancy until now—expects her accouchement about the tenth proximo.

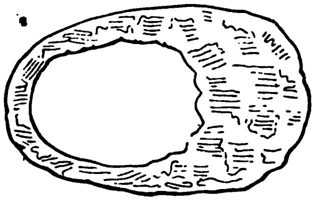
At six P. M. she was attacked with flooding, since which time she has lost probably more than eight ounces of blood, which still continues to ooze slowly away. They showed me a hard vaginal coagulum, larger than the whole thumb. Figure 93, annexed, represents the size of the os uteri and the thickness of its edges: the posterior lip, which is much thicker than the remainder of the circle, is seen on the left side of the plan; this lip is prolonged into a tumor that bleeds at the slightest touch, and is evidently a mass of carcinomatous tissue in open ulceration. The figure, half size of nature, gives a correct notion of the profile of this tumor, and of the degree of the aperture of the os uteri, in which the child's head is represented as pressing

Fig. 93.



upon the cervix and os. The tumor is seen in profile descending into the vagina. Figure 94 gives a front view of it. The tumor is hard, wholly undilatable, so that the whole of the dilatation hitherto effected, has been effected at the expense of three-fifths of the circle, the remaining heterologue two-fifths not having furnished anything to the dilatation, or, if anything, an uncomputable proportion.

Fig. 94.

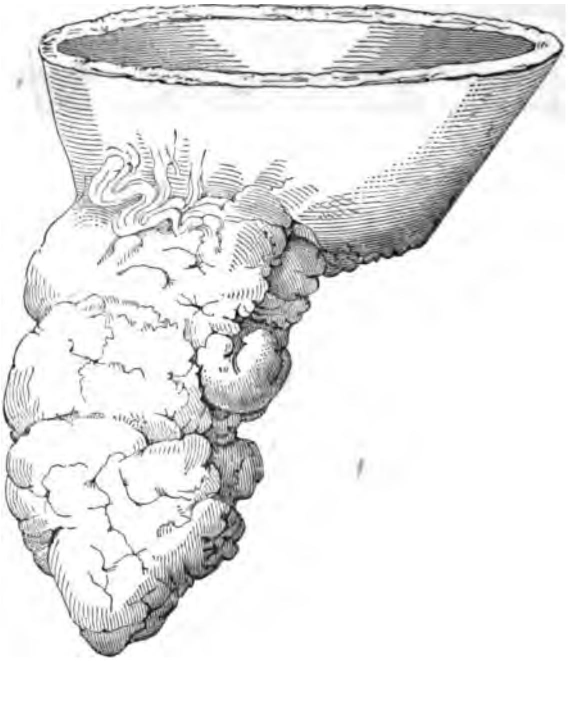


Agreeably to the decision in consultation, she got an enema of forty five drops of laudanum mixed in a fluidounce of clear starch.

March 19th, 12 M. She slept well after the enema, and has had no pain to-day.

21st. Has continued well up to 3 P. M. to-day, when she was seized with the pains of labor, attended with inconsiderable hemorrhage. I was again summoned to the consultation at 5½ P. M. The os uteri was dilating. The tumor was now found nearer to the left ischium, as if the womb had been rolled upon its axis. As the pains in-

Fig. 95.



creased, her distress became very great indeed,—I may say unspeakably great. The child had attained to within twenty days of term, and it was apparent that full two-fifths and more of the cone of the cervix uteri could not furnish any material for the necessary dilatation. Hence there must be the greatest danger of rupturing the tissue; and accordingly at six o'clock in the afternoon, the whole projecting mass of the tumor came away into the hand of the gentleman in attendance who handed it to me, and of which a good representation is given in Figure 95.

The lady was a person of admirable temper and manners, but the greatest courage and the utmost stretch of her Christian fortitude and patience could not conceal from the anxious spectators the extremity of her agony.

There was no great increase of hemorrhage after the separation and escape of the tumor, but the bag of waters was thrust down far outside of the ostium vaginæ, soon after which, at 6½ P. M., the child was expelled. A solution of morphia was administered to her, and she became composed. At one o'clock in the morning, she was seized with a rigor, which soon became a violent ague, that lasted more than an hour, whereupon febrile reaction ensued, with a pulse at 180 beats per minute. This febrile condition was attended with violent pain and intense sensibility of the abdomen to pressure. There had been very little discharge since the expulsion of the child, and the mass of the uterus was well and firmly contracted. Upon the establishment of the febrile reaction, she was bled to the amount of twenty-two ounces, with great relief to her distress, and without the least appearance of syncope.

Wednesday, March 22d. At one o'clock to-day, she suddenly began to sink. She was in the full possession of her intellectual powers, and had not the slightest pain. She died in the afternoon. Upon examining the body about twenty-four hours after death, there was no trace of hemorrhage in the belly, nor any marks of peritonitis. These figures were drawn by Mr. Gihon, and represent the tumor correctly.

I have met with some examples of carcinoma of the cervix in pregnancy, which did not prevent the patients from recovering from the lying-in; but I lately saw a woman who was delivered while affected with carcinoma of the cervix and vagina. The parts gave way, and she died.

Smallpox.—There can scarcely be a more disturbing cause of parturition than smallpox existing in a woman in labor.

I will not say that every woman who gives birth to a child while laboring under smallpox must inevitably perish, since my clinical experience has shown me that the contrary may, however rarely, be the case. But I do hold to the opinion that a pregnant woman, laboring under a considerable attack of smallpox, is far more likely to be lost than saved, whether she miscarries, whether she be prematurely confined, or whether she give birth to her child at the full term of utero-gestation. A pregnant woman may be attacked with smallpox even in its most direful confluent form, and yet recover well, provided labor does not come on in the course of the disease; but if she be confined or suffer abortion, she shall hardly escape death by hemorrhage from the womb, or by metro-phlebitis coming on early after the detachment and expulsion of the placenta.

Late authors on obstetrics have expressed the opinion that the bleeding orifices upon the inner aspect of the womb—those, to wit, which give issue to the lochia—cannot be restored to health save by the intervention of adhesive inflammation of those vessels. That adhesive inflammation, how slight soever it may be, is phlebitis. They further express the opinion that the milk-fever of women, and the milk-fever which is known to affect our domestic quadrupeds after parturition, is the constitutional disorder developed by the purely topical and limited phlebitis affecting the uterine orifices above mentioned. This opinion appears to me to be worthy of respect upon a bare annunciation of it, as well as from the confidence to be reposed in the judgment of the authors in question.

My earnest desire, in introducing this section here is, in the first place to point out the great necessity there is for pregnant women scrupulously to avoid the contagion of variola; for I think I am quite correct in stating that the sentiment of the profession is almost unanimous, that the woman who is confined during smallpox dies; and secondly, to let the Student beware not to expose his gravid patient to the least danger of variolous infection; and, therefore, never to venture, under any circumstances, to vaccinate a pregnant woman, or one recently confined. To give this precept is the essential motive I had for introducing this article into my work, and I am the more desirous to attract the attention of the Student to this point, because I know that the brethren in general are not in the least suspicious, that to vaccinate a pregnant woman is to expose her to great hazard. If the virus of smallpox is eminently inimical to the life of the pregnant female, I aver that the virus of the vaccine inoculation is little less so than that of unmitigated smallpox.

If the Student will take two clean lancets, and insert the points of them into a mature smallpox pustule, he may send one of them a hundred leagues eastward, and with it inoculate an unprotected individual, who will receive from it the infection of variola; and consecutive inoculation from this line would repeat variola for centuries. Let him send the other lancet a hundred leagues westward, and with it inoculate the udder of a healthy cow. He will in this way communicate to the animal a vaccine infection, from which vaccine inoculation of human beings may be consecutively repeated for centuries. So that the variolous pustule in the human being has communicated the vaccine infection to the cow, which vaccine infection may likewise be repeated, without modifying it further, through an unknown series of human bodies. The generical force of the inferior animal has modified a poison produced by the generical force of the human being. It has changed it, not destroyed it. It retains a portion of its variolous power which is inimical to the pregnant woman, and to expose one to its rage is a gross imprudence and misapprehension which I hope no Student reading this book will ever be guilty of. The shocking spectacles of distress that I have witnessed, from the vaccination of pregnant females, have so impressed my mind with the enormity of the imprudence, that nothing, I think, could tempt me to commit it myself. The most furious phlebitis, which is endangitis, and which becomes pyæmic fever, is one of the consequences likely to result from every true or spurious vaccination of a pregnant female. I am firmly convinced that it is far better for the physician, during an epidemic of smallpox, to leave his pregnant patient to the chance of a natural infection, than to certainly bring her within the range of its virulent power by a vaccine inoculation, which is but a variolous inoculation modified by the generical force of an inferior zoological genus.

If I venture to put forth such opinions as the above, it is hardly incumbent upon me further to protest against the temerity of those who, during the existence of a smallpox epidemic, recommend, and even proffer, what is called revaccination to those who, having been already vaccinated, might be held to be protected; I mean, to pregnant women. I have seen pregnant women very nigh to term, unnecessarily revaccinated, with consequences so terrific that I think I would not, for a thousand golden crowns, either vaccinate or revaccinate any woman knowing her to be pregnant.

Scarlatina.—A woman who should have the misfortune to be seized with scarlet fever, and to be brought to bed while affected with it, would be more apt to die than to recover. Dr. Dewees used to say:

"The woman who has scarlatina in her Lying-in, dies." This, though true in general, presents exceptional cases. I have had four such cases, in which all the patients recovered, to my great surprise and pleasure. In my work on *Children*, I gave, in the article on Scarlatina, my views as to the nature of that malady. If, as I there suppose, scarlatina is essentially an inflammation of the vasa vasorum, and derm capillaries, we need not be surprised at the tendency of it in women newly delivered, to result in pyæmic or other forms of the puerperal fever.

Twins and Triplets.—In Churchill's *System of Midwifery*, Phila ed. 1846, p. 411, there are statistical statements on the subject of twin and triplet pregnancies. Dr. Churchill states that out of 448,998 cases of pregnancy, we have 5,776 cases of twins, or one in 77¾, and 77 cases of triplets, or one in 5,831 cases. A case that occurs only once in 77 labors, and in the course of some men's practice not so frequently, will be esteemed to be preternatural; for that is natural which occurs constantly, that is most nearly natural which occurs frequently, and that is preternatural which occurs very rarely. A triplet labor, which, according to Dr. Churchill, occurs only once in 5,831 cases, will certainly be admitted to be an unnatural labor, or, to use a technical phrase, a preternatural labor. I shall not err, then, in setting down twin and triplet cases as cases of preternatural labor; at least, I find it more convenient to arrange them here than to give a separate chapter on the subject.

As a general rule, a twin labor is not suspected to be so until after the birth of the first child, for a woman carrying twins in the womb is frequently found not to be larger than she who carries but a single one. Two children of six pounds' weight each, do not oppress so much as a single child of twelve pounds and a half, and the liquor amnii of the double pregnancy may be far less in quantity than the liquor amnii of a unipara womb. When a woman in the latter weeks of her pregnancy becomes very lusty as it is called, or when the abdominal walls, becoming weakened, allow the uterus to fall far forward so as to make the belly a little pendulous, that circumstance may give rise to misapprehension, and the woman is apt to fear she will be so unfortunate as to give birth to twins. In practice, the Student will find that ten women shall fear twin labor, for one that shall really suffer it; and that in ten twin labors, there shall be only three or four in which twins shall be suspected to exist. It is not difficult during the pregnancy to ascertain the existence of twins, since the stethoscope reveals the pulsations of two distinct hearts; and, moreover, during the flaccid state of a womb, if a woman lie upon the back, the feet drawn up, it is not difficult by external palpation to detect the presence of two distinct, orbicular, hard heads.

Although I prefer to speak of twin and triplet labors in the chapter on preternatural labors, I am ready to admit that many women giving birth to twins, find themselves delivered promptly and with little pain; especially when the children, as is usually the case, are under size; nevertheless, in twin labors with large children—and I have seen two children the sum of whose weights was sixteeen pounds and a half, and where the ova contained a very extraordinary amount of liquor amnii—the process of parturition is slow, disheartening, and painful. The overloaded uterus acts feebly and irregularly; the labor is long in establishing itself, the excessive extension of the muscular tissue of the uterus preventing the organ from propelling the point of the ovum into the cervix and through the orifice of the os; the bag of waters is therefore slow to be formed.

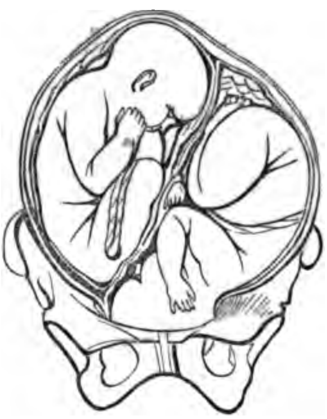
It rarely happens that the waters of both the ova come off together. If the amniotic sac which contains the first child or the presenting child should have discharged its fluid contents, then the expulsive power of the uterus must be communicated to the advancing child through the unbroken ovum of the second birth: such an elastic and compressible medium for the transmission of the expulsive force must have the effect of decomposing it, and rendering its exertion futile. If the membranes of the first child remain whole, and those of the second child be broken and discharged, as sometimes happens, the same effect is produced. I saw a twin labor in which the first child pushed the placenta of its brother before it into the world.

In case both ova are ruptured, the lowermost child must be thrust down by the uppermost child; but, as the uppermost child is never directly above the lowermost, the force must be communicated laterally, and it acts obliquely upon the body of its mate. The practitioner who finds an os uteri ductile and not reluctant, is ordinarily embarrassed to make up his opinion as to the cause of the slowness of the labor, where the resistance is small and the woman in good health. He might be tempted on this account to exhibit ergot, or administer stimulants, or some provocative to increased uterine action. He ought to do no such thing; the duty of an accoucheur is to inquire into the cause of the slowness. Let him rise from his seat and apply his ear to the abdomen of the woman; if he finds the fœtal heart, let him ascertain its place, as relative to the top of the symphysis pubis, nearer or more remote from it in the hypogastrium; and knowing where the head is, then, with his hand upon the abdominal uterine tumor, he will at once come to the conclusion that the womb contains one child, or more than one child. In the latter case, let him find the heart of the second child, and the position of that heart will afford him a tolerably good diagnostic as to the presentation of the second twin. If the accoucheur finds the uterus overloaded, and that it is acting at a great disadvantage in consequence of its being compelled to communicate its expulsive force through the body of the first child obliquely to that of the advancing twin, he will understand his case and act accordingly.

In twin labors, the children may present both by the head, or one by the head and the other by the breech, as in Fig. 96.

In case both the children present by the head, there is risk that when the first head shall have fairly sunk below the plane of the superior strait, the other head may be thrust downwards near the superior strait, against the throat of the first child, which it crushes against the opposing wall of the pelvis, and thus locks the lower head, which cannot descend because the thorax to which it is attached cannot enter the brim, on account of the presence there of the second head. Let the Student imagine the difficulty of treating such a case; for the first head fills the cavity in such a way as to prevent his passing his hand up, and when the fœtal head is once fairly within the excavation, it becomes an extraordinarily difficult and often impossible thing to thrust it above the superior strait again to turn and deliver. I am happy to say that my clinical experience has never furnished me with an example of this sort. A case of the kind occurred to one of my brethren here a few years since, which embarrassed him greatly. He could neither return the first head, nor displace the second; he took the measure, therefore, of decapitating the lowermost child, and after its head was removed the second child was delivered, and the headless trunk of the first one followed it.

Fig. 96.



In case the first child should present by the breech, and descend through the pelvis, there is always great reason to fear that the second child, presenting by the head, might have its head urged down faster than the head of the breechling; if it should be jammed into the strait, alongside the throat, before the other head can get possession of it, it would present another example of the process in which one head is keyed by another. There is less danger in this case than in the former, because the trunk of the child would not form an insuperable obstacle to the passage of a hand, whereby to displace the keying head.

It has happened to me, on different occasions, to find the woman becoming so much fatigued, so much worn out indeed, by the protracted efforts of a twin labor, that I felt obliged at the last to give the assistance of my forceps both for the first and second child.

A labor with twins is one in which there may be either one or two placentæ. It sometimes happens that both the children are contained in a single chorion, but each child must have its own amnion; if there are two chorions, there will be two placentæ, and those placentæ will be situated in different and opposite parts of the uterus. A labor in which there are two separate placentæ, and in which the first placenta is detached and discharged with the child, is one in which the placental superficies is likely to bleed, for there cannot be immediate condensation of the placental superficies of such a womb.

A twin labor, in which there is a single chorion and a single amnion, is one which could scarcely fail to give birth to a monster, for there is nothing to prevent the fusion of the parts of twins contained within the same amniotic sac, whereas such fusion of parts is impossible in two separate amnia. Chang and Eng must have existed in a single amnion; so did Ritâ-Christina. The same must have been the case with Dr. Pfeiffer's double-headed infant, to which I refer the Student, and with my specimens of omphalodyms contained in the museum of Jefferson Medical College.

One never has charge of a twin labor without feeling some anxiety with regard to hemorrhage likely to follow the birth of the first child, and no accoucheur should dare to leave the woman until she be safely delivered of the second. As a general rule, the same contractility of the uterus which expels the first child, after a slight pause resumes its operation for the expulsion of the second, just as happens as to the expulsion of the after-birth in a unipara labor; and we may, therefore, expect that within the hour the presenting part of the second child shall descend through the os uteri into the vagina. I think I have never waited so long as an hour. When the membranes have already been ruptured, I have found the child to descend earlier than that, and when they had not already given way, I have ruptured the ovum within twenty minutes. As my own experience in this particular has been fortunate, I venture, upon that ground, to advise the medical Student to follow the same course. Some persons prefer to wait longer, and I admit, if the patient be carefully observed, if there be no signs of hemorrhage or faintness, or other urgent motive for interfering, one might feel himself justified in waiting longer than I have indicated. Let him always make the diagnosis as to the presentation before he proceeds to rupture the ovum, and should he find a cross birth, a possible event, let him hasten to pass his hand high up on the side of the ovum, penetrate it there, and seize the feet to turn and deliver.

Whenever hemorrhage is suspected to have begun, or is known to have commenced, there should be no hesitation in rupturing the membranes; the discharge of the second sac fulfils Louise Bourgeois's commandment to let the water off in order that the womb may condense itself. The accoucheur, under such circumstances, would act according to the indication: if the hemorrhage is sudden and startling, he would turn and deliver, provided the head is above the superior strait; he would seize and extract it with the forceps, provided it were in the excavation.

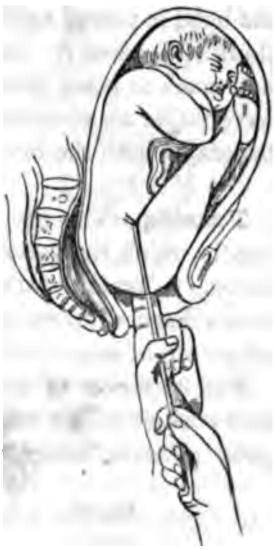
As soon as the second child is born, pressure should be made upon the hypogastrium to promote a tonic contraction of the uterus; the lately over-distended, but now relaxed belly should be sustained by a proper binder and compress, and the placenta or placentas should be carefully extracted.

In triplet labors the same causes of slowness of parturition exist as in the twin case; the expulsive power is even more decomposed, since it is communicated through three bodies; there is the advantage, however, that triplets are smaller than twins, and the distension of the cervix uteri, the vagina and the external organs, is not so great as in unipara or twin labors, in consequence of which the last pains are less distressing. I was called in consultation to a lady in labor, however, who gave birth to triplets, the sum of whose weights was twenty-one pounds and a half; they were fine children; the mother had nearly lost her life from an exhausting hemorrhage, which followed the birth of the last child. The superficies of the placenta, required for the aëration and support of three such children, must have been vast, and a most powerful contraction of the uterine globe would be required to constringe the uterine orifices after such a labor.

I have never seen a case in which four children were delivered at one birth.

Preternatural labors may be terminated with the hand alone, or by means of instruments. The simplest midwifery instrument is the fillet, which consists of a ribbon of silk or linen. The fillet is now chiefly employed as a means of drawing down the buttock, in cases of breech labor, where the pains are incapable of completing the delivery. A very good fillet may be made of a linen roller some three inches wide and twenty-eight or thirty inches in length. It is not always a very easy matter to apply it—and there is great difficulty to get it adjusted except when the breech is quite low in the excavation and completely out of the circle of the os uteri. Previously to making any attempt to use it, it should be prepared, by drawing it through the hand filled with a good quantity of lard—or else it may be soaked in thick flaxseed tea, or in white of eggs. Without this precaution, it will not pass over the thigh of the child, or it will rub the surfaces so as to cause excoriation.

Fig. 97.



To make use of the fillet, let it be passed over the thigh that is nearest the pubis, as in Fig. 97. Roll up four or five inches of one of the ends of the ribbon into a roller, which may be passed into the vagina, and pushed with one or two fingers, between the belly of the child and the front of the thigh which is in contact with the belly. The point of the finger will carry the little ball or roller across the groin either inwards or outwards, as the case may be, and when it has got free from the pressure of the surfaces of contact, the roller or ball at the end may be brought out at the ostium vaginæ, and the remaining portion passed upwards, so as to get the fillet arranged to allow the two free ends to be tied.

The drawing, Fig. 97, shows the appearance of the fillet, when rightly placed, and the mode of operating with it.

The efficacy of its action would be greatly enhanced by placing it upon the groin that is farthest from the pubal arch—but that is a feat of dexterity that can rarely be performed.

In drawing downwards, one should act only during a pain, or coincidently with a tenesmic effort of the patient, and it should never be forgotten, that the neck of the thigh bone is a very frangible thing in the unborn fœtus. This caution is necessary to prevent a fracture or dislocation of the hip-joint. The mere remembrance that such an accident might happen, would prevent any prudent person from exerting undue force with the fillet.

Notwithstanding the reasonable dread of doing mischief by violent and untimely tractions, it is true that great assistance may, by this simple implement, be given to the woman in a breech labor.

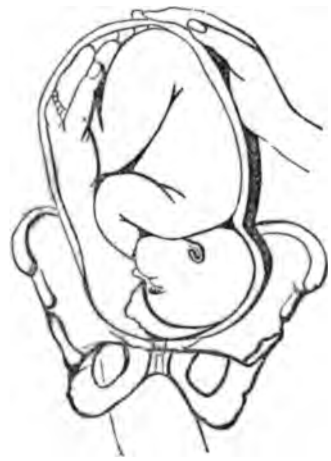
The fillet is also applied, on some occasions, to the wrist in prolapsion of the hand, in order, by means of it, to keep the hand down at the side, when we turn to deliver in shoulder cases. I have never found it necessary to take any such precaution; as I have always thought that I could bring down the arm, in case it should be lifted alongside of the head, and I have not chosen to embarrass myself with the string.

The fillet is also by some writers recommended as a means of securing one foot that has been brought out at the vulva, in turning, while the hand is passed upwards again to seek for the other foot. I do not think it necessary. Indeed, when I have got one foot down, I care not much to bring down the other; for, if it be left in the womb, we have rather an advantage by it; since, in such a delivery, we have the benefit of both the footling and breech labor.

Turning.—The Student has learned that the most natural labor, one in which the vertex presents in the first position, may suddenly become a preternatural one in consequence of the coming on of hemorrhage, a series of bad fainting fits, convulsions, &c. &c., any of which might establish the indication to proceed at once to the delivery.

Fig. 98 serves to show the situation of the child presenting in the first position of the vertex. It may be that this child's head had, in a good measure, occupied the circle of the os uteri before the accident occurred which established the indication to deliver by turning. If the head had wholly escaped from the circle, the indication to deliver by turning must have been considered wholly set aside in favor of a forceps operation; for when the head has once escaped from the os into the vagina, it cannot be thrust into the womb again, because the cervix uteri will by that time have contracted around the neck of the infant. Hence the rule of practice is to turn and deliver if the head be still in the womb; but if it be in the vagina, we are to extract it by the forceps. In fact, if it be

Fig. 98.



y in the vagina, it is below the superior strait; but to attempt
turn the head through the superior strait and through a con-
d os uteri also, is a thing too preposterous to be thought of.

e drawing above mentioned, Fig. 98, will show the Student
he will have to do if he makes up his mind to turn. It will show
namely, that he will be obliged to thrust the head out of the
of the superior strait, which it now occupies, to let his hand
pwards in exploration: he will
y inspecting the figure, that he
seek for the feet in the right
rior upper part of the womb,
s he must push the head, there-
pwards and to the left, and not
rds and to the right, and must
the feet with the palmar, and
ith the dorsal surface of the
which hand shall he use? Let
ook at the figure, and he will
at, in this labor, he must use
ft hand, and, carrying that hand
rds, according to the directions
in my article on Turning, at
416, he will find the feet, one
th, as in the figure, and grasping them firmly with the thumb
fingers, he will draw them downwards towards the os uteri,
ing his left hand, inside, by means of the right one pressed upon
ndus of the womb, outside. In this way, drawing the feet down-
, he keeps the head above the plane of the superior strait by
s of his wrist and palm. This is
caution he must by no means
ok, lest the head, urged down-
by the force of the contrac-
should become engaged in the
together with the foot, as seems
to happen in the drawing annexed,
100. If, through forgetfulness of
uty, or want of proper dexterity, he
d permit this accident to happen, he
l procure for himself superabound-
exations, for his patient a great
se of pain and hazard, and for the
an almost certain death. Let him never forget, therefore, while
ng down the foot, that he must keep the head up if possible.

Fig. 99.

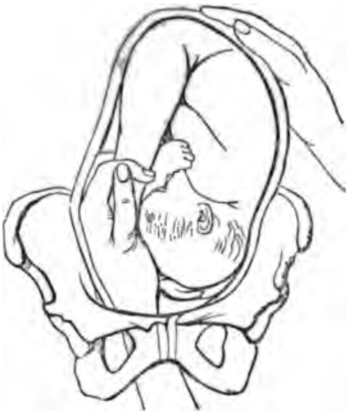
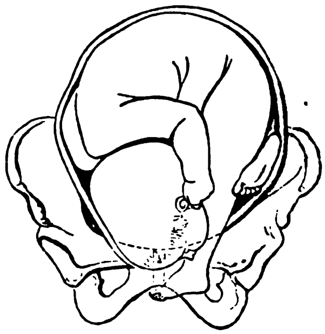


Fig. 100.



After drawing the feet through the ostium vaginæ, and when the turning is completed, which he will know by exploring with the right

Fig. 101.

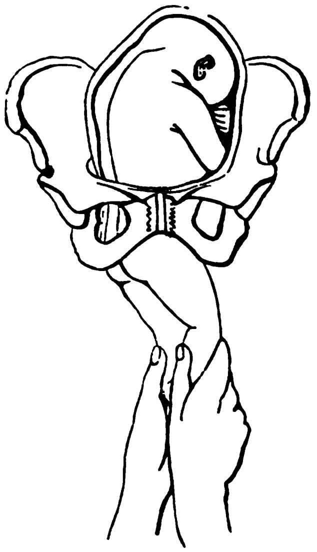
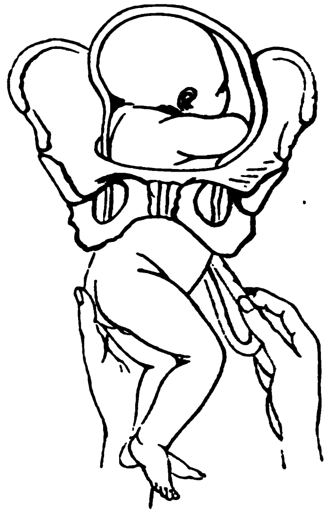


Fig. 102.

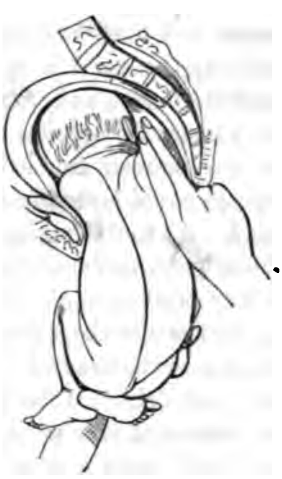


hand the form of the abdomen, and by perceiving that the hips of the child are engaging in the excavation, he should, if he draws at all by the limbs, make his chief effort of traction by means of the right leg, as in Fig. 101. By acting in this way he will cause the child's face to turn towards the left sacro-iliac junction. Before the turning, it looked towards the right sacro-iliac junction. Let him look again at Fig. 101, to see how he would make the face of the child come to the front of the pelvis if he should incautiously make tractions upon the left foot only.

When he has extracted the child as far as the navel, let him do what is represented in Fig. 102, that is to say, let him carefully draw down a considerable loop of the umbilical cord, so that no danger may be incurred of breaking it or tearing it out by its roots at the umbilical ring.

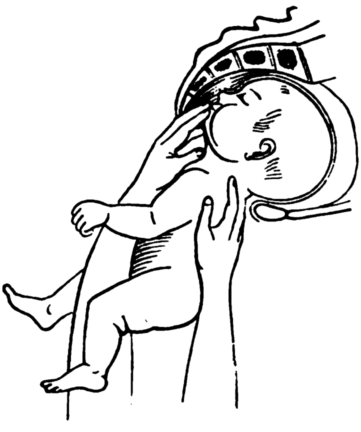
The patient should now be turned upon her back, and the child's legs should be wrapped in a napkin, to hold them securely. As soon as a good part of the thorax is expelled, let him pass two fingers upwards to the top of the shoulder that is most within reach, raising the body of the child upwards towards the woman's abdomen if he desires to get at the posterior shoulder, or depressing it towards the sacrum if he wishes to act on the anterior shoulder. Sliding his fingers from the acromion as far as he can towards the bend of the elbow, let him force the elbow downwards, causing it to sweep along the breast of the child. As soon as the elbow is withdrawn, the hand will come forth and the shoulder be extricated, after which let him proceed in like manner with the remaining shoulder, using the fingers of the other hand as in Fig. 103.

Fig. 103.



Both shoulders being delivered, let the Student next raise the trunk of the child upwards towards the mother's abdomen, much higher than is represented in the annexed design, Fig. 104. It is extremely important not to forget this rule. What the Student wants at this point, is a great flexion of the head; let him, therefore, carry the breast far away from the chin by turning the child's trunk upwards towards, or even on the mother's abdomen, as above directed, and then introducing one or two fingers into the child's mouth, let him pull the chin towards the uplifted breast of the child—thus restoring the chin to the breast. As a general rule, this manœuvre will effect the desired flexion; not always so, however, for the mouth sometimes may be opened very wide, yet the upper maxilla not descend to close upon the lower. Let the Student, in this case, push the vertex upwards by means of two fingers inserted behind the symphysis, and then, with a finger on each side of the nose, pull the superior maxilla downwards, to make it shut the mouth. The occipito-mental diameter, see-sawed in this manner, will be made to coincide with the axis of the inferior strait, whereupon, pulling by the shoulders with one hand, and by a finger in the mouth with the other, the head may be withdrawn in a direction coinciding with the curve of Professor Carus.

Fig. 104.



Should the resistance to the escape of the head be too considerable, and the child's life in danger from the delay, two fingers of the left hand may be passed into the vagina as high as the malar bones, one finger on each side of the nose. The fingers being now somewhat flexed, will thrust the posterior wall of the vagina away from the mouth and nostrils, giving free access of the atmospheric air to those orifices; the child, though unborn, will cry, and allow time for the patient to rest, and for the accoucheur to consider of his duty. I have heard this *vagitus vaginalis* for many minutes, and, indeed, have in this manner enabled the child to continue breathing until my forceps could be brought, from a considerable distance, to deliver the head. As to the manner of applying the forceps in this case, I refer the Student to the chapter describing the uses of that instrument.

The Student ought carefully, yet promptly, to decide upon the line of duty under the sudden emergencies of this sort of labor. To set the matter before him in a clear light, let me reiterate the precept, to turn and deliver if the head be not in the vagina, and to deliver by the forceps if it is wholly expelled from the mouth of the womb. If he should make a mistake as to these points of duty, he might inflict serious injury upon his patient, by passing the blades of his instrument within the contracting bands of the cervix uteri; or, on the other hand, he might allow her to bleed to death from hemorrhage, while expecting the return of the messenger sent to bring his forceps from the distance of half a mile.

I was sent for to assist a gentleman waiting upon a woman in labor, and arriving at the spot in a very few minutes, found both the child and the mother dead upon the bed: my friend, the accoucheur, told me that he had been sent for with an urgent request to hasten to the house, but being absent from his office, considerable delay occurred; when he came to the bedside, he found the woman flooding dangerously, and much exhausted by the loss. Perceiving the exigency of her case, he dispatched a messenger for his forceps; in the mean time the flooding continued. When the forceps were put in his hands, he was baffled, as he told me, in adjusting them—the head retreating upwards whenever he attempted to apply them. After the loss of an additional portion of time—a fatal loss—he succeeded in seizing the head, and delivering the child, which was dead. The mother expired very soon after the birth of her infant. Suppose he had turned and delivered by the feet!

CASE.—Some years ago, I was engaged by a tailor to take care of his wife in her approaching confinement: he was an avaricious fellow, who disliked nothing more than the paying of a fee. In the middle of the night, his wife was seized with the pains of labor, which immediately became violent and expulsive. He ran for an old woman in the neighborhood, who arrived just in time to receive the child, which she severed, and immediately proceeded to wash and dress it, leaving the woman lying upon the bed. "Ah-ha!" said the tailor, "this is a very good thing; we'll cheat the doctor out of his fee." And so he rejoiced and was very glad; but in a short time the poor woman fainted, and remained a long time insensible; whereupon, he came for me in furious haste, telling me that his wife was either dead or dying, and begging me, for God's sake, to give her speedy assistance. I soon reached the apartment, and found her speechless and pulseless, and pale, and lying in a puddle of coagula and fluid blood. Placing my hand upon her abdomen, I found there was another child there. I now took away all her pillows; opened the windows; dashed water freely upon her face and neck; and with difficulty succeeded in getting down a few swallows of strong brandy and water. The head presented; I ruptured the membranes, and passing my hand upwards to the feet, seized them, turned and delivered the child, and immediately afterwards removed the placentas. I was for some time doubtful whether she would live or die, but she finally rallied under stimulation, and got quite well.

I think that four minutes had not elapsed from the time that I reached her apartment until the child was delivered. Suppose that, like my friend mentioned in the former case, I had sent to my house for the forceps, would my patient have survived? Suppose he, instead of sending for his instruments had immediately delivered her by turning, would he have lost both the mother and her child? It is said, that it is the last straw that breaketh the mule's back. It might as truly be said, that it is the last ounce that kills in the uterine hemorrhage.

Having now described the operation for delivery in preternatural labors, the head presenting in the first vertex position, I have to indicate the method of proceeding in the other positions of the vertex. In all important particulars of the management, the former directions may be regarded as sufficiently full. But, as in the second position, the face of the child looks towards the left sacro-iliac symphysis, it is necessary, on that account, to employ in the turning the RIGHT HAND, and not the left hand, as before.

By introducing the right hand for the operation, the head will be pushed out of the plane of the strait to the right upwards, and made to lodge in part upon the brim, and in part upon the wrist and inner face of the forearm, while the fingers, going up along the breast and belly of the child, seek for, and at length find, the feet.

When caught, one or both the feet are brought out of the os uteri into the vagina, and so through the ostium vaginæ. Due care should always be used not to force the version while the uterus is contracting. It may be expected to contract several times during the act of turning.

Inasmuch as the face looked to the left sacro-iliac junction at the beginning, it might be expected, when completely turned, to look towards the right acetabulum, and it would probably do so, if care were not taken to draw chiefly upon the left foot: by doing which, the left trochanter will be brought to the arch, and then it may, as soon as it has completely come forth, be forced over towards the right ischial ramus, which will serve to bring the left shoulder also to the right acetabulum when it begins to engage. The face of the child will of course, under these circumstances, be turned to the right sacro-iliac junction, and finally sink into the hollow of the sacrum. I need not here reiterate directions, already sufficiently explained and insisted on in the former article.

The operator may find the child that he is about to turn, presenting in the fourth position of the vertex, in which case the forehead will look to the left acetabulum, and the vertex to the right sacro-iliac junction. To turn in this position of the child, he should employ the right hand, which passing up on the left side of the pelvis, between the face and the brim, thrusts the head above the right anterior semi-circumference of the strait, where it must be resisted by the wrist or arm, while the fingers explore the cavity in search of the feet. If the child were turned without being rotated upon its axis, its face, after the version, would be at the right sacro-iliac junction, and this would be well; but still, in order to insure an occipito-anterior position of the vertex after turning, it would be safest to act chiefly upon the left foot in making the tractions. I shall not repeat the directions for the other parts of the process.

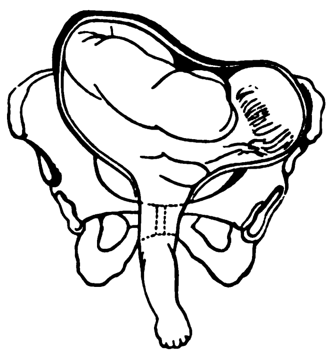
In the fifth position, the fontanelle is found at the left sacro-iliac junction, and the top of the forehead at the right acetabulum. If the woman were lying on her left side and the accoucheur seated with his face turned in the opposite direction he might, conveniently, employ his right hand in the version, for the palm of the hand slightly pronated would glide along the right side of the breast and abdomen of the child in search of the feet. The child, having been completely turned, would have its face addressed toward the left posterior part of the womb; in making the last tractions, therefore, the Student ought to be advised to draw chiefly upon the right foot in order to bring the right trochanter to the pubic arch, and, as soon as it shall have been fairly expelled, turn the trochanter towards the left ischial ramus, which will secure the descent of the shoulder in the neighborhood of the left acetabulum, and the subsequent engagement of the head in an occipito-anterior position. There is no necessity for repeating the minute directions as to the conduct of this version.

In cases of version in the third and sixth positions, cases never likely to occur, the accoucheur could use either the right or the left hand, as he might deem most convenient to himself; the choice being indifferent, the occipito-frontal diameter of the child coinciding with the antero-posterior diameter of the pelvis.

Turning in Shoulder Presentations.—The turning and delivery of the child in head presentations are less difficult than in the operation for version in shoulder cases.

In a former part of this volume, I have stated that there are two shoulder positions for each shoulder, making four in all. There are two positions for the right shoulder. In the first, the head of the child is on the left side of the pelvis, as in the annexed figure 105. This figure represents a shoulder presentation with the right hand prolapsed; the palm of the hand must look towards the mother's back, and its dorsum towards the pubis; the face looks backwards, and the feet of the child are in the back part of the womb, so that, in seeking for them, the accoucheur should pass his hand along the breast of the child, and expect to find its feet not far from its sternum. To pass the hand between the child and the pubes would be to make a distressing mistake, for it would be impossible to turn the child in that way, and it would be wrong to expect to find its feet lying on its back. To perform version the woman should lie upon her back, the hips being near to the edge of the bed, the thighs abducted, and strongly flexed: the right hand should be chosen (to look at Fig. 105 is enough to show that the right hand is the preferable one), for the points of the fingers easily direct themselves towards the pelvic extremity of the fœtus; and a moderate supination of the arm applies the hand to the breast and abdomen of the child; the fingers could scarcely close between

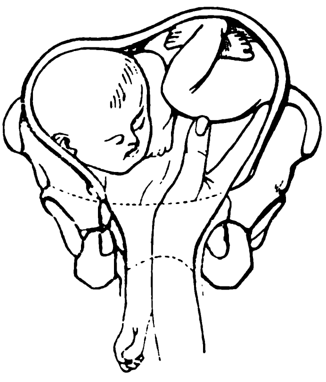
Fig. 105.



the abdomen of the child and the posterior aspect of the womb without grasping the feet or knees, whereas, to use the left hand would be to point the fingers towards the cephalic extremity of the fœtus, and if the feet should be caught in that way, it would be necessary to let them go again. Therefore, in the first position of the right shoulder presentation, the Student will be careful to employ his right hand for the version.

Suppose the Student, in performing this version, should take hold of the left foot of the child, he would (let him look at Fig. 105) cause it to revolve upon its axis and bring its face towards the mother's abdomen. This is what he desires not to do, for the chief intention which he should set before him is that of bringing the vertex to the symphysis, and the face to the sacrum. He ought to get both feet, if possible: having both feet in his hand, it will be in his power to draw the child by the right foot, which will bring the right trochanter to the pubic arch, and the right shoulder to the left acetabulum, which will let the face come into the pelvis looking backwards towards the left.

Fig. 106.

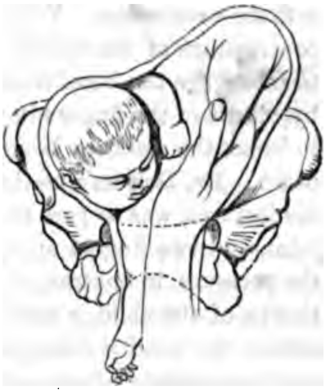


The second position of the right shoulder presentation is neatly figured in the accompanying drawing, Fig. 106. It represents the body of the child very much compressed by the contracted womb from which the waters have been expelled, and the hand of the accoucheur, which is here the right hand, partially engaged in the cervix uteri, seeking for the feet. It would be as well, in this particular labor, provided the patient were lying on the back, to use the left hand in version; but, if she were lying on her left side, the right hand would be far more convenient than the left, since, introduced between pronation and supination, it would apply itself to the breast and abdomen of the child.

Fig. 107 shows the process of operation, which is here being properly conducted, for the tractions are being made upon the left limb, which would serve to roll the child upon its axis so as to turn its face towards the posterior semi-circumference of the pelvis.

The left shoulder presentation has, likewise, two positions. In the first of them, the head is found on the left side of the pelvis, and the face of the child looks front. In the second, it is placed toward the right side of the pelvis, the face looking backwards. In the first position, the left arm being down, the feet should be found between the belly of the child and the anterior wall of the womb; the rule obtains, therefore, in this as in all cases, of passing the exploring hand upwards along the front of the child's body. If the woman were lying upon her left side, with her knees drawn up with a pillow between them, the palm of the right hand would readily apply itself to the anterior aspect of the fœtus: the left hand would be highly inconvenient for this operation; it might be used in the dorsal decubitus, but not so conveniently as the right.

Fig. 107.

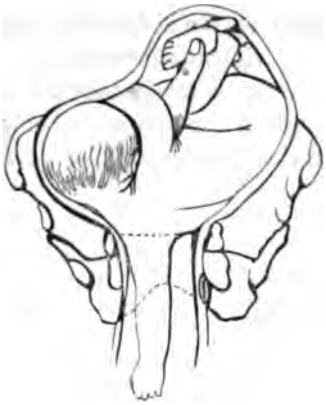


The child's face is looking to the front; it ought to be rolled upon its axis so that the face may look backwards, giving it at last an occipito-anterior position; therefore let the operator direct his chief efforts upon the right inferior extremity, which alone can roll it upon its axis and turn the face backwards.

In the second position of the left shoulder presentation, the head is on the right side of the pelvis, looking backwards, the left shoulder is down, and the hand or elbow prolapsed or not; it is indifferent whether they be or be not prolapsed.

Figure 108 explains the operation; the left hand is employed, for its fingers go out towards the pelvic extremity of the child, and its palm, in easy pronation, adapts itself to its anterior aspect. If the Student should draw the child down by the right inferior extremity, he would roll it on its axis. This would be wrong, since the child's face is already backwards; let him, therefore, make his chief tractions by the left limb, in order to bring the left hip to the symphysis, which, after it is born, should be rotated towards the right ischium, to bring the face into the hollow of the sacrum at last.

Fig. 108.



I ought not to omit some advertence to an accident that occasionally happens, whether in version or in original pelvic presentations. I allude to the locking of the head above the brim of the pelvis, which becomes keyed there by the fore arm; the elbow being elevated, and the hand projecting backward behind the nucha, it serves as a key to prevent the head from sinking into the excavation. When the pressure, in consequence of aggravate contractions of the womb, becomes very great, it is nearly impossibl to disengage the hand from behind the neck, by depressing the elbow by means of the fingers in the way formerly pointed out;—it is easie to break the delicate bone of the humerus than to bring the elbow down. Dr. Dewees's method, one upon which he strongly insisted i his lectures, was to pass two fingers upwards in front of the shoulder joint, and two fingers up against the opposite scapula. By means o the pressure in contrary directions of these two opposite hands, the thorax of the child is made to revolve upon its axis one quarter of a circle; the hand is disengaged from behind the throat by this rotation, and immediately afterwards brought down by pulling at the bend of the elbow.

It has been proposed to bring the head back to the brim of the pelvis. I have attempted to succeed in this version by the head, but have always signally failed, with the exception of a case related in a former page of this work. In that instance, I succeeded by means of pressure made upon the external surface of the abdomen. The attempt might always be made with propriety in those cases in which the contractions of the womb have not as yet driven the presenting parts firmly into the opening. With a loose and flaccid uterus, the Student might have the good fortune, after lifting the shoulder out of the way, to lodge the head fairly in his palm, and pushing the fundus uteri in an opposite direction so as to raise the breech of the child, draw the head to the abdominal strait and let it engage therein. I think no very violent efforts should be made to effect this kind of version; and it must be rarely that the os uteri will be found sufficiently dilated to allow of the operation being even attempted—for, when the os is well opened, the presenting part is already far down in the excavation.

CHAPTER XIV.

PRETERNATURAL LABOR FROM DEFORMED PELVIS.

In former pages of this work, to wit, in Chapter I., I treated of the pelvis as normally constituted. The Student, from reading that chapter, has become acquainted with the dimensions of the planes of the two straits, and with the excavation.

He knows that the osseous frame consists of a soft gelatinous material which hath become rigid and extremely solid and compact by the deposit within it of phosphate of lime. He knows that to macerate a bone in a strong acid solution is to dissolve out from it the whole of its calcareous solid matter, leaving to the bone its pristine form and dimensions, but leaving it, at the same time, compressible and flexible in every direction; for all that is left of the bone after the maceration is a gelatinous mixed with a fibrous and cellular material.

Now the child that is born may become, in one of the early years of its existence, the subject of a disease, one of whose most prominent characteristics is to prevent a deposition of the calcareous phosphate in the substance of the gelatinous framework of the bone; not wholly, indeed, but to such a degree as to leave the bone softish and compressible, or flexible. Again, a child may grow up in apparent health, having conformably developed all the parts of its constitution—its phosphatic deposits having been completely made up to a certain term, and giving to its bones a due degree of solidity and firmness; whereupon it may be attacked with disease, whose effect shall be to remove from the gelatinous framework of its bones a large proportion of the calcareous portion already deposited.

These two cases present examples, the one of a suspension of the process of deposition, and the other of a removal of the phosphates already deposited. The former is Rachitis, or Rickets. The latter is Mollities ossium, or softening of the bones. The effect is the same in either case. In rachitis, the child continues to grow without removal of the ancient phosphate, and the bone bends or is crushed. In the latter the ancient phosphate is removed and the bone bends, or is crushed. It bends, or is crushed under superincumbent weight. If the child laboring under rachitis should recover from that malady, it would regain its power to solidify its bone by depositing calcareous matter within its intimate structure. But, should the solid matter be replaced while the bone in its plastic condition is pressed or bent out of its due shape, it might acquire the most consummate health, and remain ever after affected with the deformity.

If the humerus, the radius, the femur, or the tibia should regain its solid phosphate, those several bones would be found arcuated—bent like a bow—and remain ever so. If the ossa innominata, which consist of the ilia, ischia, and pubes, should be the seat of the softening processes, and if during a long-protracted illness, the child should lie chiefly upon her right side, or upon her left buttock, the sacro-pubal diameter of the pelvis would allow its pubic extremity to be turned towards the right side of the child, and *vice versâ.* This would produce what is called the obliquely deformed pelvis—dass schraage verengte beckens—of Professor Næg̀ele of Heidelberg, for the wing of the sacrum of the lower side would not grow as rapidly as the opposite one. It is, however, to be understood that where the wing of the sacrum is faulty, there is reason to believe it may have been so in an early embryonal stage.

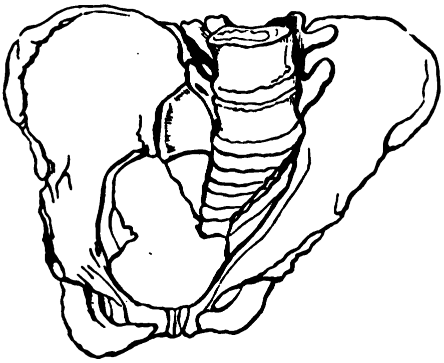
The Student will perceive that such a pelvis as this must lose a portion of that diameter which extends from the left acetabulum to the right sacro-iliac symphysis, provided the pubis be deflected to the right side, and so, *mutatis mutandis.*

In case the Student should be charged with the conduct of labor for a woman affected with right oblique deformed pelvis, he will perceive the necessity there is to direct, if possible, the vertex of the child to the right rather than to the left acetabulum of the mother; for, as the occipito-frontal diameter of the fœtus exceeds its bi-parietal diameter, he would sedulously endeavor to make the greatest diameter of the head coincide with the greatest diameter of the pelvis, in order to render easier a delivery, which would be difficult, laborious, and even impracticable, were he to persist in attempts to force the long diameter of the head through the contracted diagonal of the pelvis. This is one of the cases in which turning and delivery by the feet are allowable in deformed pelvis.

Having made a perfect diagnosis of the deformity, he will find himself able, in performing the act of version, to adjust the smallest diameters of the fœtal cranium in such a way as to make them coincide with the smallest diameters of the pelvic passages.

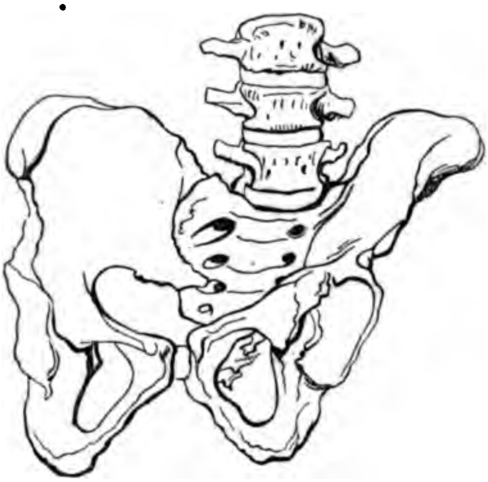
The annexed figure (109), taken from Professor Nægèle's work on the oblique-deformed pelvis, shows that, if the vertex should be directed towards the left acetabulum, the dimensions of the strait are so much altered there by the fall of the pubis towards the right, that little expectation could be indulged of the descent of the cranium below the plane; for the antero-posterior diameter of the cranium exceeds four inches and a half, while the bi-parietal diameter is 3.88.

Fig. 109.



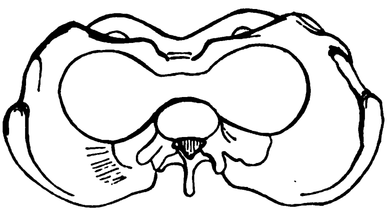
I subjoin the figure of a pelvis preserved in my collection (Fig. 110). It will be seen that it is right oblique deformed, like that described by Professor Nægèle. Its dimensions, which I now carefully measure, are from the promontory of the sacrum to the top of the symphysis pubis, 3.6; from the promontory of the sacrum to the point of the coccyx, 3.5; from the right acetabulum to the left sacro-iliac junction, 4.1; from the left acetabulum to the right sacro-iliac junction, 2.7; from the top of the right ischium to the top of the left ischium, 3.7;

Fig. 110.



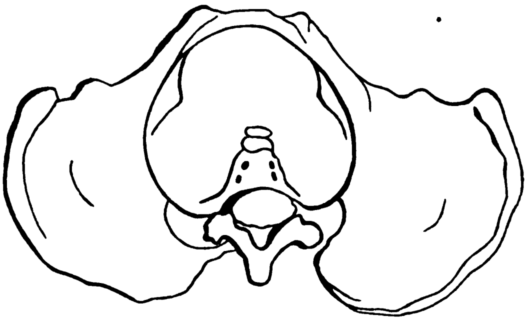
from the inner lip of the right tuber ischii to that of the left tuber ischii, 3.5; from the point of the coccyx to the crown of the pubal arch, 4.2; from the point of the coccyx to the inner lip of the left tuber, 1.9; to the right tuber, 3.5; the length of the symphysis pubis, 1.

Fig. 111.



I shall proceed now to speak of other deformities of the pelvis. Rachitis or Mollities does not necessarily affect the whole of a bone. The figure 111, which I subjoin, represents the plane of a superior strait like the figure 8. It is evident upon inspection that the posterior semi-circumference of the pelvis has not suffered at all in its form, as the Student may perceive by comparing it with Fig. 112, which I have taken from the pelvis of an Egyptian lady of rank from the tombs of Thebes, which specimen was presented to me by my friend, the late Samuel George Morton, the distinguished author of the *Crania Americana*. This pelvis, which is one of the most perfect specimens of the female pelvis that I have ever seen, may serve as a means of comparing the posterior semi-circumference of the badly deformed pelvis, Fig. 111, with the posterior semi-circumference of this most perfect Egyptian form. It shows that the deformity in Fig. 111 has arisen from rachitis or mollities affecting chiefly the pubal and ischial portions of its ossa innominata, which, having fallen inwards upon the promontorium of the sacrum, have so reduced the antero-posterior diameter of the superior strait as to render the passage wholly impracticable for the full grown fœtus.

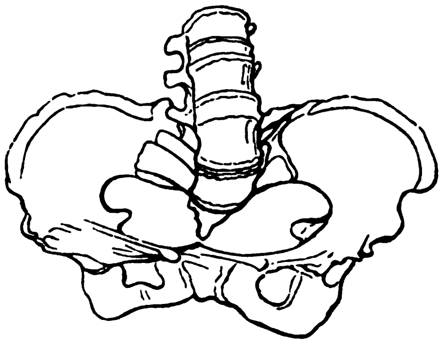
Fig. 112.



In such a pelvis as this, the pregnant woman ought to be advised to submit to an early abortion, whereby she might be preserved from an ultimate direful necessity to undergo a Cæsarean operation; for when the antero-posterior diameter of the pelvis is only an inch and a half in length, it is impossible to extract a nine months fœtus, except that fœtus be either of an under size, or else in a state of absolute decomposition, circumstances not to be expected, and, therefore, not to be relied upon, nor scarcely to be hoped for. Dr. Simpson's late case, published in an English journal, might serve rather to mislead the practitioner with vain hopes of an unparalleled good fortune like that which his patient enjoyed, than as a precept to be generally followed.

I annex the figure of another pelvis (Fig. 113), in which the distortion has attacked the sacrum itself, as well as the pubes and ischia, and partially the left ilium. In such a pelvis as this, provided the antero-posterior diameter should not be reduced below three inches, good hope might be entertained of extracting a living child by means of dexterous and patient use of the forceps, especially should the child be rather under size, and one in which the progress of ossification had not gone so far as to render the bones of the cranium very firm and resisting. But as a child's head, in its bi-parietal diameter, according to my measurements, will average 3.88, and as, in a series of three hundred heads, I found but one under 3.50, there will be in general but faint prospect here of extracting a full-grown child alive. The records, however, contain abundant examples of cases in which the fœtus at term was spontaneously expelled in pelves reduced as low as 2.50. In the treatment of such a case as the one now under consideration, the least reflecting Student must perceive that, in adjusting the position of the head, it would be desirable for him to bring the bi-parietal diameter, which is the smallest diameter of the head, into coincidence with the antero-posterior, which is the smallest diameter of such a pelvis; and further, that in any attempt to assist the natural powers by means of the forceps, it would

Fig. 113.



be preposterous to think of adjusting the blades upon the sides of the head in that direction. The pelvis is already perhaps fatally small. To apply the blades of the forceps, then, would be considerably to increase the necessity for some reduction in the transverse diameter of the head. Common sense, therefore, would teach him that if he must apply the additional force, it must be applied to the face and occiput of the child. The blades of Davis's forceps, even when the handles are perfectly shut, are 3.9 asunder. It would be impossible, therefore, to extract the forceps in that direction, much less the head contained within them.

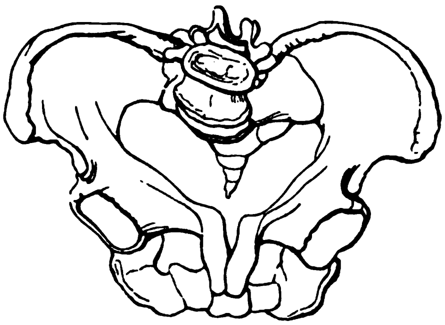
I believe the practitioners of midwifery in England are less familiar with the use of the forceps than those of the continent or of the United States. I think them quite too prone to refer to the aid of the crotchet and perforator, and cannot but indulge a disposition to dissent from their almost invariable practice of adjusting the blades upon the sides of the head, much preferring the practice of the continental physician and those of the United States, who seize the head upon the sides of the pelvis, a practice as to the safety of which I confidently speak from multiplied opportunities in my clinical experience.

This is a case, also, in which, perhaps, more properly than in other cases, the precept should be observed of attempting to deliver by turning. Those who, in restricted pelvic diameters, propose the resort to turning as a means of saving the child, and at the same time of preserving the woman from much pain and great danger, insist upon it that the chance of preservation is greater because when the child has been turned and drawn away, so as to allow the head to come to the narrowest part of the pelvis, the cranium yields, allows its diameters to be reduced, and may be disengaged from within a narrow strait, through which it could not be driven if the head were the presenting part. The idea is this: when the head is drawn through by means of traction exerted upon its neck, it undergoes a process which, as I take it, is not wholly unlike that called *wire-drawing*; whereas, when the head presents, such a process of wire-drawing cannot be supposed readily to take effect. A portion of metal can readily be drawn through the apertures of a wire-plate, which no art could drive through it from the other side.

I am not prepared in this place to go so far as Professor Simpson, of Edinburgh, in recommending a resort to version in bad pelves; and my hesitation arises from this, that the mensuration of the pelvis being an inaccurate operation, there is reason to fear that the inexperienced accoucheur might be led to institute this method in cases where excerebration is indispensable for the delivery of the head. I admit it is possible to effect excerebration in the footling case; but in a case of badly deformed pelvis, the operation implies a great risk of detruncation, an accident the most to be deprecated, for what occasion can arise for embarrassment and vexation greater than that which he experiences who is condemned to the task of extracting a detruncated head through a very much reduced superior strait of the pelvis!

In Dr. Lee's 3d Report, *Clinical Midwifery*, p. 74, 3d ed., he gives accounts of several cases of footling labors occurring in deformed pelves, in which he was obliged to diminish the head by opening the cranium through the occipital bone. In conducting those cases, that able practitioner frequently found himself greatly embarrassed in effecting the operation. To read his accounts of the cases, would be sufficient to put the Student upon his guard against the risk of encountering such embarrassments from version.

Fig. 114.

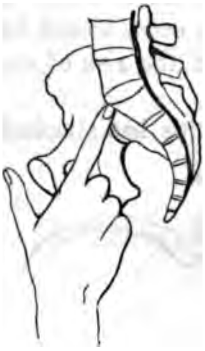


Here is another pelvis, Fig. 114, in which the rachitis has attacked the whole organ; the last lumbar vertebra, as well as the ilia, ischia, and pubes, being changed in shape. The horizontal portions of the pubes have become almost parallel, narrowing, of course, the antero-posterior diameter, and approximating the extremities of the transverse as well as the oblique diameters, so as to render hopeless any attempts to extract the child through it alive.

It appears to me needless to follow the example of writers who have reduced the deformities of the pelvis into a sort of classification. It is evident that softening of the bones, which may attack the whole or any part of the osseous structure of the basin, may yield any conceivable irregularity of form; and those that I have already spoken of in this article being sufficient to show the Student what is the nature of these deformities; and as he is already acquainted with the mean dimensions of the fœtus, he may be considered qualified to give judgment on questions of obstetrical operations arising under pelvic deviations.

It is necessary that he should be aware of the methods which are adopted for ascertaining the dimensions of the pelvis. As a general rule, the indicator finger of the accoucheur will scarcely be found capable of extending further than three and a quarter inches or three and a half inches beyond the crown of the pubal arch. It is true that, by the introduction of half the hand, the palp of the indicator finger can be made to explore a region four and a half inches distant from the crown of the arch; but, as the introduction of half the hand in the woman not in labor or affected only with the earliest stages of labor, is so painful as to excite repugnance and resistance on the part of the patient, the vaginal taxis alone is generally preferred.

Fig. 115.



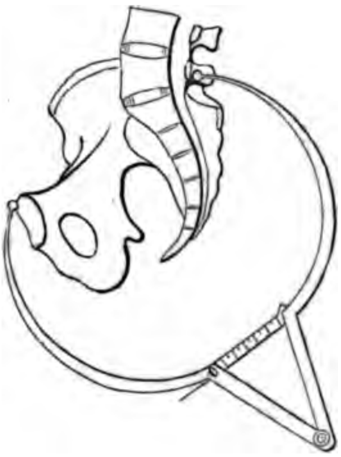
Suppose there should be some suspicion of a deviation of the pelvis—one in which the pubis has retreated towards the sacrum, or one in which the promontorium has descended towards the symphysis. If he should carry his indicator finger as in the annexed figure, directing it towards the promontory of the sacrum, and in vain endeavor to touch the sacro-vertebral angle, his exploration will teach him at once and clearly that his patient has nothing to fear on this head; but if he can readily touch it, as in the figure, then she has a deformed pelvis, proportional to the facility of the touch.

If, again, the point of the coccyx, which can always be touched with the indicator finger, is found not to approach too close to the crown of the pubal arch, uneasy apprehensions on this head are at once set aside. As for the mensuration of the transverse diameters of the inferior strait of the pelvis, the least tact, with but little experience, would show that that strait is or is not normal, and to what degree deviated, if at all.

If, however, upon introducing the index finger, it should at once encounter the sacro-vertebral angle, by pressing the point of the finger against the protuberance, and lifting its radial edge up to the crown of the arch, he can mark the point of contact with the top of the arch, and then, measuring the distance to the point of the finger, he will have an accurate report of the antero-posterior diameter.

It appears to me that there is no necessity to trouble one's self to make a provision of callipers to measure the pelvis externally, to get a report of the internal diameters of it; nor need one procure an intro-pelvimeter, which is more apt to mislead him than the hand, and which, moreover, is both inconvenient and painful in its application.

Fig. 116.



Nevertheless, if he should be inclined to avail himself of the use of the callipers, he may learn in the annexed figure the mode of its application. Applying one of the buttons of the calliper to the symphysis pubis, and the other to the spinous process of the fifth lumbar vertebra, the scale will mark the space by which the buttons are divided. Let him subtract from that space half an inch for the thickness of the symphysis pubis, and two and a half inches for the space between the sacro-vertebral angle and the spinous process on which the button rests, and he will have three inches to deduct from the whole sum; the remainder is to be taken as the antero-posterior diameter of the plane of the superior strait. If he will refer to Fig. 114, in which the pubis projects in consequence of the parallelism of its horizontal rami, he will at once perceive the futility of an attempt to deduce the internal capacity of that pelvis from an external measurement.

The great matter for him is to determine the indication of treatment in the case, and that must clearly arise from a consideration of the actual state and wants of the patient, and not from any rules or precepts that can be set down in any book whatever. A gentleman might, for example, be impressed with the propriety of trusting to the unassisted powers of nature a patient whose antero-posterior diameter at the superior strait is three or even less than three inches, and he would be led to do so from an opinion he should form of the ability of the woman to support for a long time the efforts and the irritation of a most laborious labor; whereas, in another patient, having a pelvis of precisely the same dimensions, he might find the most urgent necessity to deliver immediately, to preserve her from otherwise inevitable death.

Besides deformities of the pelvis from mollities ossium and rachitis, there are other affections of the capacity of the basin, which are produced by bad arrangement of the form of the pubic arch—cases in which the arch is Saracenic, and not Roman; the descending rami of the pubes, instead of divaricating so considerably as to allow the rounded occiput to rise quite up into contact with the triangular ligament of the pubis, compel it to descend far below the crown of the arch, to extend and be born.

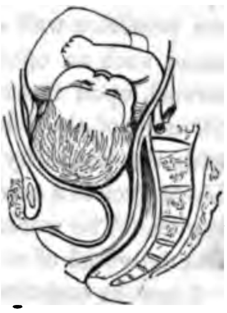
Such a form of the arch is precisely equivalent to a preternaturally long symphysis pubis. The easiest labor, *cæteris paribus*, is that in which the symphysis pubis is the shortest—that in fact, in which the symphysis is but a narrow bar under which the head has an early opportunity to be extended in the third act of the mechanism of the head in the labor. In all cases where the arch is very narrow, and the head is compelled to descend very low previous to commencing its act of extension, the distress of the patient and her hazard are considerably augmented by the necessity of thrusting the perineum so much further down previous to commencing its act of extension. I have seen such labors in which the woman made the most desperate efforts at expulsion, and have been compelled, in consequence of this species of deformity, to exert all my strength and dexterity to extract the fœtal head with the forceps.

The obstetrical properties of the pelvis depend mainly upon the conformation of the anterior aspect of the sacrum: where its curve is too great, the point of the coccyx interferes with the antero-posterior diameter of the inferior strait, and where the curve is too small, that most important act in the mechanism, the rotation of the head, is rendered difficult, if not indeed impossible. I speak, from painful experience, of the difficulties I have encountered from this cause, in cases in which, having found the spontaneous rotation not possible, I have been compelled to effect it by locking the child's head in the blades of the forceps, and then, with a difficulty, and cautiousness, and slowness, and doubt, calculated to impress my mind with a sentiment not very different from one of horror, and after protracted efforts, finally crowned by success as to the mother at least—and sometimes, both for the mother and child—have thanked God for their escape.

Case.—On the 5th of January, 1849, I delivered a lady of her seventh child. It was the fifth forceps operation required in her case. The child's head measured, in its occipito-mental diameter, six inches; its occipito-frontal was $5\frac{9}{20}$ths, and its bi-parietal $4\frac{9}{20}$ths. There was no rotation. The left-hand blade of my forceps was applied upon the occipital region, and the right-hand blade upon the frontal region. After the most exhausting efforts on my part, and unspeakable suffering on hers, the child was delivered with its vertex to the left tuber ischii, and its forehead to the right. To-day, January 9, the mother and child appear to be in perfect health.

Notwithstanding I have already spoken of cases of labor rendered preternatural by prolapsion of the bladder, more properly to be called vaginal vesicocele, to which I refer the Student, I annex a drawing (Fig. 117), to show the mode in which the over-distended bladder may get beneath the head so as to prevent its descent. Fatal consequences might ensue from a mistake in the diagnosis of this case, of which the remedy is to be found in the use of the catheter.

Fig. 117.



In a former part of this book, is an account of a case that occurred to me in consultation with Dr. Bicknell—that of a woman in whom a large mass of intestinal convolutions had fallen down below the uterus and filled the cavity of the pelvis, occupying the recto-vaginal cul-de-sac, and distending it to an enormous size. This cause converted an otherwise perfectly healthy labor into a preternatural one. I think it probable that the woman would ultimately have fallen into a state of exhaustion, or that she would have developed inflammation in the mass of half strangulated intestinal convolutions, had not the cause of difficulty been ascertained, and the labor brought to a rapid conclusion by the return of the prolapsed bowel into the cavity of the abdomen. It is proper to cite the example in this connection, were it merely to indicate the possibility of such an occurrence, and the necessity of interference.

Many cases are mentioned of labors rendered preternatural by the engagement of a firm tumor, consisting of altered ovary occupying a considerable part of the excavation of the pelvis, and so preventing the descent and passage of the head. The rule of action, under such circumstances should be to endeavor by all the means in one's power to return the tumor above the strait; and, as such a tumor must necessarily be behind the uterus, attempts to push it out of the way would be far more likely to succeed, were the patient placed on the knees, the top of the breast being pressed upon the same plane on which the knees rest: the pelvis being thus elevated, the uterus would by gravitation be drawn far upwards out of the pelvis, leaving a more ample space for the reposition of the tumor; and the patient placed in this position is completely deprived of the tenesmic, or bearing-down power, a slight exertion of which would be sufficient, in almost any case, to contravene the efforts of the practitioner. In all such cases, then, I advise the Student to cause his patient to be placed in the position above indicated, and with the hand in the vagina or one or two fingers in the rectum, endeavor to displace the tumor upwards.

It has been recommended, where displacement of the tumor upwards proves to be impossible, to endeavor to reduce its magnitude by puncturing it with a trocar, or incising it with a bistoury through the posterior wall of the vagina. I do not feel at liberty to recommend such an operation—one which could only be legitimately performed, upon mature consultation with the most acute and able practitioners of the vicinity. They alone should feel themselves vested with the authority to act under such terrible circumstances. Dr. Lever recites a case in which he punctured such a tumor through the vagina. The woman recovered happily, and at a subsequent period was delivered of a child by a Mr. Newth, surgeon.

I saw, in consultation with Dr. Beesley, of this city, a lady in whom a large heterologue mass seemed to spring from the left semi-circumference of the brim of the pelvis and iliac fossa, overhanging apparently nearly one-half of the plane of the superior strait. When labor came on, and the bag of waters was formed, the vaginal cervix became farciminal or cylindrical, so that, having got beneath the overhanging mass, it lifted it upwards and turned it over to the left side, permitting the head to fall into the excavation, whence it was soon happily expelled. After the birth of the child, the tumor resumed its former position, and the woman recovered.

An interesting account of tumors obstructing labor, by Dr. S. C. W. Lever, may be found in *Guy's Hospital Reports*, 1843, vol. i. p. 26.

Laceration of the Womb and Vagina.—It appears to me probable that most lacerations, or ruptures, as they are called, commence in the posterior wall of the vagina, nigh to the cervix uteri, where the vaginal wall consists merely of the mucous body and vaginal cellular tela, resting on a basement of peritoneum: the tube is so thin at this place that it is surprising to witness its power to resist, in certain labors where women, to the expulsive powers of the uterus, add all the force they are capable of exerting by means of their adjutory muscles. When the tissue becomes still thinner, as in being distended by a very large head, one would think that a fissure a line in length might prove the beginning of a laceration in which the rest of the vagina and the whole vaginal cervix would give way like a bit of torn linen. In any such case, if the head or presenting part should escape beyond the tube of the vagina or wall of the uterus, the pain will be greatly exaggerated and the uterus make haste to expel its burden into the peritoneal sac.

Upon the expulsion of the child and the contents of the uterus into the belly, the labor-throes cease, and a great calm immediately follows the accident, which is suspected to take place merely upon such a sudden and extraordinary cessation of the process, but which is known to have taken place, on discovering that the presenting part can no longer be detected, in consequence of its having escaped from the cavity which contained it.

Upon discovering even the smallest commencement of a laceration of the vagina or cervix uteri, the earliest precautions should be taken to insure delivery *per vias naturales*, and the prevention of the escape of the child into the peritoneal sac. This should be done, where it is practicable and convenient, by seizing the head, if it be the head, in the forceps; by bringing down the feet, if it be a breech; by turning and delivering, if it be a shoulder case; or a case of face presentation, or a departure of the chin, or any condition, indeed, in which the operation of version would be most likely to rescue the woman from the dangers by which she is surrounded.

Should the laceration have permitted the child to escape into the peritoneal sac, let the attendant lose no time, but bare his arm, and resolutely, with his hand passed through the rent, explore the abdomen in search of the feet, which he should immediately withdraw through the opening of the laceration. But if this be not done at once; if some hours should have elapsed subsequent to the occurrence of the accident; if the woman be already much exhausted by hemorrhage, by constitutional shock and irritation, the question will arise as to the properest manner of fulfilling the indication, which must ever be to extract the child. The hemorrhage will now have been stayed: were it not so, the woman would be already dead. To pass the hand through the rent, should it be in the vagina, would be to set the hemorrhage on foot again. It will be impossible afterwards to pass the hand through the rent in the uterus, because the uterus, being now contracted, will have reduced the size of the rent in proportion to the condensation of the organ. The child having passed through while the uterus was yet undiminished in size, can never be returned through a contracted rent, and the question arises as to the mode in which the indication is to be carried out.

I am convinced that, should I be called to the conduct of such a case, I should feel bound by my conscience to recommend delivery by gastrotomy. I cannot think that a clean incised wound along the linea alba, sufficient in length to permit the extraction of the child from the peritoneal sac, however exceptionable in itself merely considered, can be held in the least degree objectionable when compared with the delay, the fatigue, the contusion, and the renewal of the suspended hemorrhage, that would inevitably attend an attempt to extract *per vias naturales.* I express this opinion here, upon a most vivid recollection of the distress which I occasioned to an unfortunate woman, who in consequence of a laceration affecting the posterior wall of the vagina and the vaginal cervix, drove her child into the cavity of the belly. As the head could be Touched, and as the child was dead—nearly twenty hours having elapsed since its escape from the uterus—I made use of the perforator, and then, seizing the head through the opening, with my embryotomy forceps, I used all the force which it was possible for me to employ in drawing it away through the natural passages. The unfortunate woman, who bore the rude operation with the greatest constancy and courage, lingered many hours after its close. The events of this case, which, peradventure, might have had a happier conclusion by means of the gastrotomy operation, have impressed me, more than a thousand arguments could do, with a deep conviction of the cruelty of such a mode of delivery; and I repeat here, in the most distinct terms, my decided preference for a delivery by means of an incision through the linea alba. The brilliant success of my fellow-townsman, Professor John Neill, in curing such a case by gastrotomy, only causes me the more to lament that I did not insist, in my case, on the same method of treatment.

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CHAPTER XV.

OF THE FORCEPS.

"BUT yf all these medicines profite not, then must be used more severe and hard remedies, with instruments, as hokes, tongues, and such other thynges made for the nonce. And fyrst, the woman muste be layde along upright, the middle part of her bodye lying hier then all the rest, companyed with women assisting her about, to comfort her and to kepe her downe, that when the byrth is plucked out she rise not withall. Then let the Mydwyfe annoynt her lefte hande with the oyle of white Lillies, or other that may make it soople and smothe, and holding out her fingers, shutting together her hand, let her put it into the Matrix to feele and perceyve after what fashion the dead byrth lyeth in the Mother's wombe, so that she may the better put in hookes and such other instruments to plucke it out withall."

"Yf it be that it lye the head forwarde then fasten a hooke eyther uppon one of the eyes of it," &c. &c.

The above quotation from the "Woman's Booke, or the Byrth of Mankynde," may serve to show the Student what notions of Midwifery were entertained in the glorious age of Queen Elizabeth. Thomas Rainald, the author of this quaint old English, is the earliest English author on Midwifery. The volume from which I have made the extract was "imprinted London 1565," 4to. It consists chiefly of a translation from Rhodion. Let the Student be thankful that, in the age in which he lives, he is not foreordained to the use of hooks and other such instruments in difficult cases, for, in modern times, the resources of the obstetric art have been signally augmented by the discovery, and by the great perfection attained in constructing and using instruments for the forced delivery of the parturient woman. The ancients were not wanting in numerous inventions for expediting the birth of children, but, unhappily, all their instruments were constructed with the sole view and intention of being useful to the mother, and had no applicability to the child, except to extract it after depriving it of existence, or even to draw it forth from the womb still palpitating with life, and presenting the most shocking spectacle of mutilation and distress. The *Uncus*, or Crotchet, described by Celsus, continued, indeed, to be the model of obstetric instruments down to the close of the seventeenth century, when a happy thought resulted in the construction of an apparatus most perfectly adapted for the security both of mother and child, and which, at the present day, and in the hands of skilful and well-instructed persons, may be considered one of the greatest triumphs of art in behalf of suffering humanity.

Perhaps one of the ideas that would most readily and spontaneously present itself, in a case of difficult labor with a head presentation, would be to take hold of the head and draw it forth; and I believe that most of the good women who so assiduously exhort us to *help* our patients, actually do believe that we can take hold of the child's head with our fingers, and draw it into the world as readily as we can draw a dollar out of a purse, or take an apple from a basket. But we cannot take hold of the head and pull it down, simply because we cannot grasp an infant's head in the hand: we can apply the fingers to one side, and a thumb to the other side, and press it between them; but when we attempt to pull the head down, we find that the fingers and thumb are not long enough to admit of our *grasping* it; and we withdraw the hand, leaving the head just where it was before we made the foolish attempt, and the woman so much the worse for the additional irritation.

This attempt during the lapse of centuries, must have been made many thousands of times, and always with the same result; and the idea of extracting it with a pincers or forceps, sufficiently large to grasp the head, must also have presented itself for ages; but how to apply the forceps? A straight forceps could not grasp the head, for it would slip off, as if wedge-shaped; while to make the forceps curved, so as to grasp the head, would render it impossible to introduce it, since the forceps must first enter closed into the genital fissure, and then expand considerably to pass over the parietal protuberances so as to grasp the head when carried upwards far enough. It could not expand sufficiently to go over a head large enough to occupy with its own bulk the entire capacity of the excavation. Such, in fact, was the forceps of Palfyn, and such must have been the instrument spoken of by some of the Arabians. No forceps that could be got on to the undelivered head had been discovered; and in all cases, where the child could not be pushed back and turned, or where the head became permanently arrested, the medical people were obliged either to let the mother and her offspring perish together, or they unscrupulously sacrificed the child, to insure the escape of its parent. Our ancestors consoled themselves with a quotation from Tertullian to the following effect: "*Atquin et in ipso adhuc utero, infans trucidatur necessariâ crudelitate, quum in exitu obliquatus, denegat partum, matricidus qui moriturus.*" Barely to look over some of the plates representing the obstetric instruments employed previously to the discovery of the modern obstetric forceps, is sufficient to produce a shudder in any one familiar with the difficulties met with in parturition; and the griffin's claws, sharp crotchets, and *tire-têtes*, which were the boast of their inventors in a barbarous age, serve but to set forth more signally, by comparison, the eminent usefulness of the modern instrument to which we are indebted for our own escape from the necessity of employing such means as were familiar and commonplace with our predecessors.

The great desideratum in Midwifery was a forceps that might seize the head and extract it without inflicting a wound; and we are indebted for it to a Doctor Paul Chamberlen, who practised Midwifery in England towards the close of the sixteenth century. He constructed, probably with his own hands, two curved pieces of iron, which, being introduced separately, were applied one to the left and then one to the right side of the head, and united by a pivot-joint, by means of which the two separate pieces were converted into a pincers, or forceps, the handles of which crossed at the pivot or joint, and thus made the blades become capable of grasping and firmly holding the egg-shaped head of the child, while still contained in the vagina. As the handles crossed each other, and were secured by the pivot, which passed through a drilled or mortised hole in the joint, it followed that when the outer extremities or the handles were pressed towards each other, the head was firmly grasped betwixt the blades or clamps. The compressing or holding force being duly applied, a sufficient degree of extracting power enabled the Surgeon to draw the head forth from the passages, and the child was born without experiencing the smallest injury. In inventing this instrument, Chamberlen happily combined the ideas of a *cochlea* or blade, a *junctura* or lock, and a *manubrium* or handle; and it is surprising, seeing how simple, how manageable and how powerful is the apparatus, how beneficent and desirable, that so many centuries were allowed to pass over the records of medicine before the discovery of this method of conducting difficult labors with safety to the child. For centuries, the perforator and crotchet were the mother's instrument. The child's instrument, or forceps, was reserved to honor the seventeenth century by its invention.

This great discovery, the value of which is known only to medical men, would have entitled its author to the everlasting gratitude of his fellow-creatures, had he not tarnished his fame by shamefully making a secret of what ought to have been instantly promulgated for the general use of all who should stand in need of its merciful intervention. But the spirit of the age, or perhaps his own venal spirit induced him to confine the secret to his own breast, to be communicated, at length to his sons, who were instructed in the mode of its use, and are supposed to have drawn large profits from the necessities of the unfortunate women who, knowing their superior skill, were compelled to seek for safety at their hands only.

Little is now known of these persons except their names; and they have deservedly sunk into the comparative oblivion that ought to overtake all those who, having by accident or by genius, come into the enjoyment of facilities that ought to be the common property of humanity, instead of divulging them, and spreading their use and employment as far as the want of them extends, are induced by a sordid thirst for gold to retain them within their own hands, and sometimes inhumanly permit the secret to perish, rather than give it all the publicity and currency its importance entitles it to. Such is the spirit of quackery or empiricism under whatever guise or in whatever art; and the fate of the Chamberlens, whose history is almost forgotten already, is but a just retribution for their base reservation of so valuable a secret.

There is a curious and interesting case related by Mauriceau, in which he informs us that Hugh Chamberlen, one of the sons of the inventor, went to Paris in 1670, with a view to sell his secret to government, and while there, boasted in the most confident manner of his ability to deliver any woman, in any labor, no matter how difficult, in half-a-quarter of an hour. It happened, at the time, that a woman with a deformed pelvis fell in labor, who, after vain attempts to deliver her, was put in Chamberlen's hands. He undertook the management of the case with the utmost boldness, but, after a cruel perseverance of three hours, was compelled through sheer fatigue and exhaustion, to give it over, and confess his inability to effect the delivery. The poor woman perished shortly after his retreat, and the body being examined, it was found that he had lacerated the womb and vagina in various places with the points of the forceps. Mauriceau was so disgusted with the issue of the affair, that he afterwards inveterately opposed the use of such instruments; while Chamberlen immediately returned to England, where he drew very large receipts from the practice of Midwifery in London.

As Chamberlen's preface to Mauriceau's work on the diseases of women with child and in childbed is exceedingly rare, and particularly so in the United States; and notwithstanding my detestation of his wicked conduct in concealing his invention, I deem it proper to repubh in this work his address to the readers of his translation of Mauriau. It is but a proper contribution to the literary history of Midifery, which I am sure my readers will not be sorry to possess. The llowing are his words:—

"Having long observed the great want of necessary directions how govern women with child, and in childbed, and also how new-born bes should be well ordered, I designed a small manual to that purse; but meeting, some time after in France, with this treatise of Mauceau (which, in my opinion, far exceeds all former authors, especially ulpeper, Sharp, Speculum Matricis, Sermon, &c., being less erroous, and enriched with divers new observations), I changed my resotion into that of translating him; whom I need not much commend, cause he is fortified with the approbation of the wardens of the Chirgeons' Company of Paris.

"His anatomy was in the first edition omitted, but is in this; which, ith the book, I have carefully rendered into English, for the benefit our midwives; of whom many may yet very well admit of an addinal knowledge. The principal thing worthy their observation in is book is, accurately to discover what is properly their work, and hen it is necessary to send for advice and assistance, that so, many omen and children may be preserved that now perish for want of asonable help. My author makes out the breaking of the right aters, for the proper season of a natural delivery, and whenever a ild is not born then, or soon after, nature is so much short of perrming her office. This is certainly a great truth; and all wrong rths should never be longer delayed: and for the most part floodings d convulsions not so long, lest the woman lose her life before ever e water breaks; but if no dangerous accident intervene, in a right bor, one may lengthen out their expectation to twelve hours after; d though some may have been happily delivered twenty-four hours, two days after, yet I should not advise any to run that hazard, ovided they can have an expert artist to deliver them, without deroying the child; because many have perished in that case; and it not prudent to venture, where but one of many escapes. For the nger the labor continues after the breaking of the waters, the weaker th woman and child grow, and the drier her body, which renders e birth more difficult; and 'tis ever good taking time by the forep.

" And that midwife's skill is certainly the greatest, and she deserves ost commendation, who can soonest discover the success of the labor, d accordingly either wait with patience, or timely send for advice d help. Nor can it be so great a discredit to a midwife (let some of them imagine what they please) to have a woman or child saved by a man's assistance, as to suffer either to die under her own hand although delivered. For, that midwife mistakes her office that thinks she hath performed it, by only laying the woman; because her principal duty is to take care that she and her child be well, with safety and convenient speed, parted; and if this be impossible for her and feasible by another, it will justify her better to waive her imaginary reputation, and to send for help to save the woman and child, than to let any perish, when possible to be prevented; as in the case of my author's sister, and in the twentieth chapter of the first book. Yet, in countries and places where help and good advice is not seasonably to be had, midwives are compelled to do their best, as God shall enable them; which dangerous and uncertain trials it doth not become them to put in practice upon women, where no timely assistance need be wanting. Most wrong births, with or without pain; all floodings with clods, though little or no pain, whether at full time or not; all convulsions and many first labors; and some others, though the child be right, if little or no pain, after the breaking of the waters, and the child's not following them in some six or ten hours after, require the good advice of, and, peradventure, speedy delivery by expert physicians in this practice; for though a few may escape in these cases, yet the far greater number perish, if not aided by them. Let me therefore advise the good women, not so readily to blame those midwives who are not backward, in dangerous cases, to desire advice, lest it cost them dear, by discouraging, and forcing them to presume beyond their knowledge or strength, especially when too many are over-confident.

"Those few things wherein I dissent from my author, if of dangerous consequence, are noted in the margin; if not, are left to the discretion of the reader.

"I confess he is often too prolix; a fault which the French much affect; however, I chose rather to translate him according to his own style, than contract him; and also to leave unaltered some things not very well expressed, being of small moment. I find also he distinguishes not between the words *plaister* and *ointment*, but uses them promiscuously one for the other.

"In the seventeenth chapter of the second book, my author justifies the fastening hooks in the head of a child that comes right and yet because of some difficulty or disproportion cannot pass; which I confess has been, and is yet the practice of the most expert artists in midwifery, not only in England, but throughout Europe, and has much caused the report, that where a man comes, one or both must necessarily die; and is the reason of forbearing to send, till the child is dead, or the mother dying. But I can neither approve of that practice nor those delays; because my father, brothers, and myself [though none else in Europe as I know] have, by God's blessing, and our industry, attained to and long practiced a way to deliver women in this case, without any prejudice to them or their infants; though all others (being obliged, for want of such an expedient, to use the common way) do, and must endanger, if not destroy one or both with hooks. By this manual operation, a labor may be dispatched (on the least difficulty), with fewer pains, and sooner, to the great advantage, and without danger, both of women and child. If therefore the use of hooks by physicians and chirurgeons be condemned (without thereto necessitated through some monstrous birth), we can much less approve of a midwife's using them, as some here in England boast they do; which rash presumption, in France, would call them in question for their lives.

"In the fifteenth chapter of this book, my author proposes the conveying sharp instruments into the womb, to extract a head, which is a dangerous operation, and may be much better done by our fore-mentioned art, as also the inconvenience and hazard of a child dying thereby prevented, which he supposes in the twenty-seventh chapter of this second book.

"I will now take leave to offer an apology for not publishing the secret I mention we have to extract children without hooks, where other artists use them, viz., there being my father and two brothers living, that practice this art, I cannot esteem it my own to dispose of, nor publish it without injury to them: and think I have not been unserviceable to my own country, although I do but inform them that the fore-mentioned three persons of our family, and myself, can serve them in these extremities, with greater safety than others.

"I design not this work to encourage any to practice by it, who were not bred up to it; for it will hardly make a midwife, though it may easily mend a bad one. Notwithstanding I recommend it to the perusal of all such women as are careful of their own and their friends' safeties, there being many things in it worth their noting: and designing it chiefly for the female sex, I have not troubled myself to oppose or comment upon any physical or philosophical position my author proposes. I hope no good midwives will blame me or my author for reprehending the faults of bad ones, who are only aimed at, and admonished in this work; and I am confident none but the guilty will be concerned, and take it to themselves, which I desire they may, and amend. Farewell.

"HUGH CHAMBERLEN."

I wish here to remark that, while the forceps consists of the cochlea, the junctura, and the manubrium, the instrument is essentially the cochlea or clamp, and that all inventors, and other persons who may project something better than any of the obstetric forceps now known to the profession, ought to bend the whole force of their art or genius to the improvement of the cochlea; since the junctura and the manubrium are matters of minor importance. To see the ridiculous attempts at improvement displayed in Mulder's work, and by every accoucheur who has just begun to get a small practice, is to convince one that most of the projectors regard the handle or else the joint as the thing, and wholly overlook the cochlea, which, after all, is what we want, and which, being of a good form and fabric, makes it indifferent how the lock and handle are arranged.

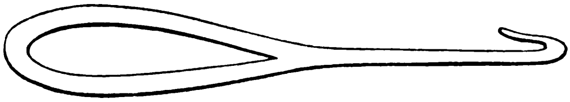
The father of the above-mentioned Hugh, Dr. Paul Chamberlen, had also for his son Dr. Peter Chamberlen, the one of whom Hugh speaks in the preface to his translation of Mauriceau. There must have been another son, since Hugh speaks of his father, his *brothers*, and himself. The name of one of the brothers appears, therefore, to be lost.

There are now in England specimens of the Chamberlen forceps, which were recently discovered in an old box, concealed beneath the floor of a country house formerly owned by the Chamberlens, at Woodham Mortimer Hall, in Essex. They have been described by Mr. Causardine, in *Med.-Chir. Trans.*, ix. 183, into whose possession they came, and who had the good sense to present them to the Museum of the Royal College of Surgeons, London. There is the greatest reason to suppose that these specimens are instruments really made by the Chamberlens themselves, and that the collection shows their progress in invention, improving the apparatus at each successive attempt, until in one of the instruments they have succeeded in obtaining a really valuable form.

Being in London, in May 1845, I was greatly obliged by the kind assistance of Prof. Ed. W. Murphy, of University College, who not only procured permission, but engaged Mr. Coxeter, the cutler, to make *fac-similes* of the Chamberlen instruments for me, of which I here present faithful drawings. These drawings are five in number.

Fig. 118 is an extremely well-formed vectis, with a blunt crotchet at

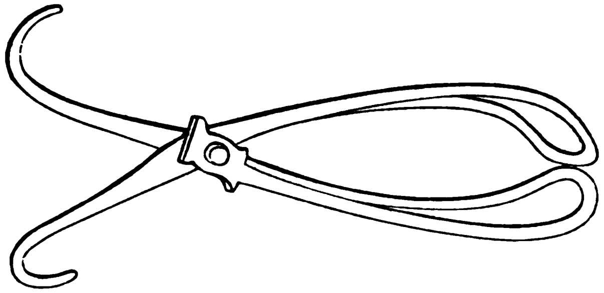
Fig. 118.



the end of the handle; the opening or fenestra is well represented in the drawing, which is from my camera lucida. The figure cannot represent the head-curve of this vectis, which is somewhat faulty in consequence of the slightness of that curve: still, it is an instrument of which one might make a fortunate use in a case of labor requiring nothing more than the vectis. The form of the hook at the other end of the handle, and the sharpness of its point, though they may perhaps entitle it to the character of the blunt-hook, might leave one, upon a narrower examination, under the impression that the Chamberlens must have employed it rather as a sharp crotchet than as a proper blunt-hook.

Fig. 119 represents, probably, the second attempt of the inventor to carry out his happy idea of the obstetric forceps; it consists of two separate pieces, with both the handles terminated by blunt-hooks; both possessing the old curve, and capable, therefore, of grasping the head when once applied to it while lying within the genital passages. I say separate pieces, since the two pieces may be taken apart by unscrewing the pivot, which in the figure is seen passing through the lock. The right hand branch was forged out of one piece of iron, like the vectis at Fig. 118; but the left hand branch was a piece of thick iron wire carried out to the extremity of the clamp, and then returned towards the lock, where its end, being flattened, forms a square head for the reception of the screw-pivot.

Fig. 119.



If this instrument, as I suppose, does really represent Chamberlen's second attempt at invention, it must be regarded as a remarkably successful effort; for, setting aside some imperfection in the amount of the old-curve or head-curve, it presents us with an apparatus, a true obstetrical forceps, of which the counterparts, being separately introduced and then locked by screwing on the pivot, might be so perfectly adjusted on a fœtal cranium as to give the operator complete power over it. The fenestra is very good: the curves, however, are extremely faulty. Not so with the forceps, Fig. 120, which is in all respects an admirable instrument as to the head-curve, as may be seen by inspecting it in the drawing. The iron of which it was forged is, it is true, rather clumsy, rough and heavy, but scarcely more to be condemned, on that account, than the heavy Berlin forceps of Professor Siebold. It had no pivot-joint, but the two compartments were fastened together by a strong flat braid, like that represented in the figure, which, being passed through holes drilled in the lock of the instrument and afterwards wrapped round the handles, would serve, after the adjustment of the blades on the head, to hold it quite securely and prevent even as much rocking motion as attends the use of the common English joint.

Fig. 120.

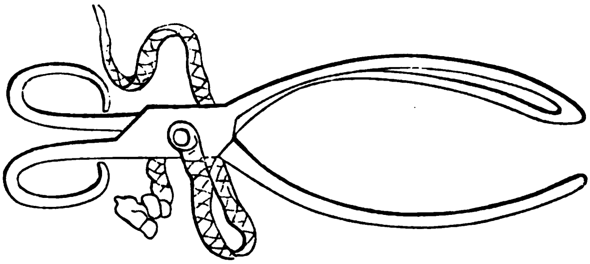


Fig. 121 shows the last and most perfect form of the obstetric forceps of the Chamberlens. It has what is now called the German lock; for the left-hand blade, or male blade, or lower blade, for these are synonymous terms, is provided with a fixed pivot, to receive upon it the female or upper blade, as may be seen at Fig. 122, in which the

Fig. 121.

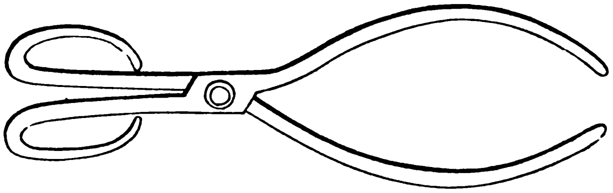
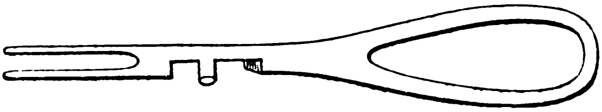


Fig. 122.



pivot is represented, the handle being terminated by the bending outwards of the iron.

I have never delivered a woman with one of these old Chamberlen instruments, and while I should much prefer a forceps made by a modern artist to either of these early specimens of the invention, I would not hesitate in any case, where the vertex was at the pubal arch, to employ either Fig. 120 or 122, if my Davis's forceps was not at hand. The instrument is scarcely inferior to the Haighton forceps, in use in England at the present day.

In 1733, Dr. Samuel Chapman published a "Treatise on the Art of Midwifery," &c., in which the forceps of the Chamberlens was given to the world; and from that time to the present day, it has undergone many modifications of form and size, and mode of coaptation: almost every distinguished practitioner or writer selecting some particular fashion as most in accordance with his especial views.

The instrument first employed had only one curve, that which applied itself to the head of the child in order to grasp it—and this is called the old-curve; it ought to be called the head-curve—so that a front view of it represents it as a straight instrument. An implement so fashioned could be easily applied to the head whenever it has descended quite into the excavation, or whenever the ear could be touched by the point of a finger introduced into the vagina. But in all cases of the head arrested in the superior strait, a forceps possessing only the old or head curve could not well be employed in its extraction, because the pelvis is itself curved, and hence when the points of the instrument should have mounted up sufficiently far to be on a level with or above the plane of the superior strait, the handles would necessarily press the edge of the perineum too far back towards the point of the coccyx. This pressure is both hazardous and painful, and endangers a painful contusion of the perineum, or even its laceration. To effect such an adaptation would always be difficult, and, in cases of rigid perineum, quite impossible.

From the period of the publication of this invention by Dr. Samuel Chapman, up to the middle of the eighteenth century, several new forms, deserving perhaps to be called improvements, were offered to the profession. For a history of these various modifications, which it is not necessary for me to present in this work, I refer the Student to Dr. Mülder's *Historia Literaria et Critica Forcipum et Vectium Obstetriciorum*, in which he will find accurate drawings of a great variety of forms and dimensions of obstetrical instruments, down to a late period in the history of that apparatus. To look at Mülder's account is enough to excite a smile in the reader at the ambition which proposes to build up a solid reputation rather by spoiling than by improving an implement already perhaps perfect.

Professor Asdrubali, in his *Trattato Generale di Obstetricia Teoretica e Prattica*, vol. iii. p. 180, refers to Professor Manni's examination of the history and properties of the obstetric forceps, and he says: "Dopo questa correzione portata nel forcipe degli Ostetrici di Londra e di Parigi circa la metà del passato secolo, parea questo stromento giunto alla sua perfezione, ma lo spirito umano, sempre irrequieto più per l'ambizione di distinguersi, che per giovare ai suoi simili, ne mise fuori una serie numerosa dei già riprovati, e talvolta più meschini di quelli." And he names the forceps of Loder, Galletti, Santarelli, Steidele, Johnson, Orms, Denman, Smith, Lowther, Osiander, Eckard, Stark, Bush, Siebold, Thenance, Du Bois, Mursinna, and Brunninghausen; and concludes that all these modifications do not exhibit any real improvement of the forceps of Smellie and Levret.

Dr. Smellie, of London, and Dr. Levret, of Paris, both conceived at about the same period, that is about the year 1745, the idea of giving to the blades a new curve on the edges, so as to adapt them to the axis of the superior as well as to that of the inferior strait; and accordingly they produced the long forceps with New Curves, which are almost universally in use at the present day. Smellie, for common purposes, used his short strait forceps, fearing that too general and indiscriminate an employment of the long curved one might prove mischievous; while Levret recommended his long and powerful instrument as being equally adapted to all cases proper for forceps-operations. Smellie's instrument was united by the reciprocal notch, called the English joint or English lock, and Levret's was joined by a pivot and mortise, with a sliding plate to secure it when united. Both instruments were provided with fenesters, but of a size insufficient to do much more than render them lighter.

The French forceps, somewhat modified by Pean, has great vogue in this country at the present time, under the denomination of the Baudelocque forceps, which is two inches longer than Levret's, and is constructed without the bead or raised line that runs around the inner or fœtal face of the clamps, and which, besides being useless, was found inconveniently to contuse or cut the scalp.

An obstetric forceps consists of two pieces or branches; a right-hand and a left-hand one, intended to be introduced separately between the sides of the head and the parts in which it is contained; but always so adjusted as to let the concave edge of the new curve look towards the front of the pelvis, to suit the curvature of which it was originally contrived or invented. The part that is called the blade or clamp, the COCHLEA, ought to be applied on the side of the head, and not on the crown or occiput, and the extremity of the clamp should reach up at least as far as the chin. Hence, in constructing a forceps, it should be always considered necessary to make the clamp or blade part, sufficiently long to reach at least from the child's vertex to its chin; a distance of about five inches in the uncompressed state of the head, but which is much increased where the head is subjected to severe long-continued compression in the passages. But while the head itself requires the clamps of the instrument to be five inches long, the different positions or situations in which it is found at the time the forceps becomes necessary, demand that there should be given to the instrument length enough to embrace the head, whether it be high or low in the pelvis; and that, in introducing them, the lock or joint, the JUNCTURA, should not be carried within the orifice of the vagina.

There must also be a handle,—manubrium,—of sufficient length and strength to admit of its being used with facility. The forceps, therefore, is divided into the cochlea or blade, the junctura or lock, and the manubrium or handle. The proportion of these several parts may be adjusted in various ways, according to the taste or judgment of the several makers of them. Dr. Smellie, who generally employed his short straight forceps, constructed them of the length of eleven inches, while to his long-curved forceps he gave a length of twelve and a half inches.

The French or Baudelocque forceps, is a powerful instrument: the specimen before me, and which is made by Messrs. Rorer, is exactly eighteen inches in length, the pivot or joint being very nearly midway between the end of the clamps and the end of the handle. The ends of the clamps approach within three-quarters of an inch when the handles are close pressed together, while the greatest distance between the clamps is not quite two inches and a half. The blade or clamp has an open fenester which is not quite an inch wide at the widest part, but is six inches long, growing narrower as it approaches the lock, where it is not three-tenths of an inch in width. The lock or joint consists of a pivot in one branch, and a notch in the other. The pivot is fixed into its own blade by a screw, the top of which is a thumb-piece, by means of which it may be screwed into or withdrawn from its place. The notch in the other blade is adjusted so as to receive the pivot into the left or outer side of the instrument, and the top of the notch being countersunk, receives a conical shoulder at the bottom of the thumb-piece of the screw, by which means it is made perfectly secure against any motion except that of opening and shutting the instrument. The end of each of the handles is curved outwards, to make a good blunt-hook, that upon occasion, may serve all the purposes for which the blunt-hook is used in Midwifery. The weight of the specimen is two pounds and seven-eighths of an ounce.

This powerful instrument, in skilful hands, may be made use of to overcome great obstacles; but, in careless or unskilful application, may be the cause of great mischief. It has been objected to by many prudent persons on account of the weight of metal, and the severe pressure of the child's head that may, almost unconsciously by the operator, be made with it. The late Dr. James very rarely used any other than a short-handled straight pair, called Haighton's forceps; yet I have had occasion to witness the application, by him, of a pair modelled upon the plan of the Baudelocque forceps. It cannot be doubted that all the benefits of the small forceps may be obtained in the use of the large one; and those who cannot conveniently command a variety of instruments would do well to familiarize themselves with that which I have above described. It has been well remarked by Baudelocque, that it is not so much the instrument that is to be looked to, as the hand that uses it.

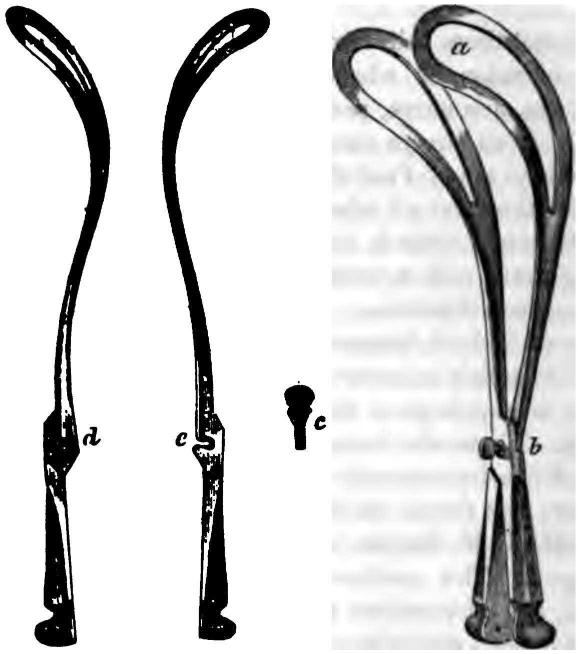
The most convenient forceps that I have ever employed, and that which I commonly make use of, is the instrument recommended by the late Professor Davis, of the London University College.

The specimen now before me is the one described in Davis's *Operative Midwifery*, and was made under his direction for me by the late Mr. Botschan, of London. It weighs ten ounces and three-quarters, and is twelve inches in length: its lock is the English lock, composed of a notch in the upper surface of the left and in the lower surface of the right-hand branch. When the handles are closed, the ends of the clamps are seven-tenths of an inch apart, while the fenesters, at their widest part, are two and three-quarter inches asunder. The broadest part of the fenester is equal to two inches, while its whole length is five inches. From the extremities of the handles to the lock or point where the branches cross, is four and a quarter inches. After the branches are crossed, they do not divaricate, but proceed in parallel lines one inch and a quarter; hence, if a fœtal head be ever so considerably elongated by the pressure of the parts, the clamps are sufficiently capacious to contain it, being seven inches long. In this instrument, such are the width and length of the fenestræ, that a large part of the parietal protuberances jut out through or beyond them when they are fixed on the head. Indeed, the fœtal head, when held within its grasp, if it be properly adjusted, can hardly sustain any injury from it, so admirably is it modelled on the convexities of the cranium.

I have several times delivered from the superior strait with Davis's forceps, an operation for which it is peculiarly well adapted by the boldness of the new-curve, particularly upon its convex or inferior edge. There is no forceps extant of which the new-curve so nearly coincides with an arc of Prof. Carus's circle. I am free to confess my preference for this over all other instruments for the safe delivery of the child, because I think it almost out of the bounds of possibility to injure the fœtus with it, provided it be perfectly well adjusted, and used with common discretion. I have not myself employed the German forceps of Siebold, because I consider that the handles are very clumsy, and so widely separated, when the instrument is adjusted on the head, as to expose us to the hazard of compressing the cranium too violently. I have also thought the handles too much curved. But the author of the instrument is justly celebrated for his skill; and I am also aware that this is the instrument preferred and often used in our city by Dr. R. M. Huston, whose judgment and skill demand my highest respect. This gentleman, who is frequently called upon for consultation, has informed me that his success with Siebold's forceps, modified by himself, causes him to esteem it above all others. It ought to be observed that Dr. Huston's forceps, although modelled upon that of Prof. Siebold, is very different from it in regard to its lightness and manuability, in consequence of the great length of the lever. This is, perhaps, a fault, if it be true, as I believe it to be, that the obstetric forceps is not a compressor, but only a tractor and double lever. Shorter handles, which lessen the power of the lever, diminish the hazards to which the child is exposed from the compressive action of the instrument, which in most cases is, perhaps, too great. Short handles do not prevent us from holding the child securely: with short handles it is possible to make traction to an extent that is dangerous. My specimen of Siebold's forceps, manufactured at Berlin, weighs twenty-seven ounces and a half, while the instrument of Dr. Huston is but twenty-one ounces in weight.

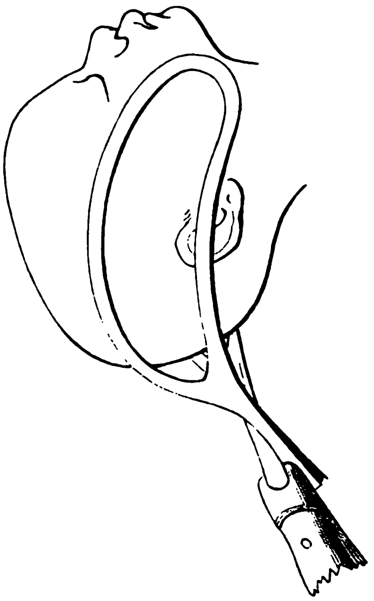
Fig. 123 is a representation of this forceps modified from Siebold's, which I have taken from Huston's edition of Churchill's *Midwifery*. Upon looking along the convex edge of the new curve of Huston's forceps, it will be seen that the line is almost straight from a point a little beyond the posterior terminus of the fenestral opening, to the handle, so that the instrument is more seemingly than really curved—for the instrument, strictly speaking, is the clamp. The clamps are not very much bent, especially the concave edge of the new curve.

Fig. 123.



I subjoin here a drawing, Fig. 124, taken in the camera lucida, of my Davis's forceps made by Botschan, applied to the head of a child. It will be seen by inspection of the concave edge of the new curve, that that edge is not very much bent, while the convex edge of the curve represents almost the quadrant of a circle; and as the convex edge turns upwards to join the handle, which springs mainly from the concave edge, and is continuous therewith, it follows that, when the instrument is introduced into the cavity of the pelvis, it rests easily therein, because it does not strain back the anterior edge of the perineum towards the anus, or, what would be worse, even near to the point of the coccyx, as must happen when

Fig. 124.



e head is seized high up in the pelvis with any other instrument. e edge of the perineum, in using this instrument, comes forward nost as far as the line which is continuous with the concave edge the curve. The great advantage attending the use of Davis's ceps, weighing ten ounces and three-quarters, is found in its light- ss, and in the shortness of its handles, which, while they afford all requisite purchase for making powerful and dangerous traction, from the shortness of the lever, serve to guard the child against mischiefs of excessive compression; and I am convinced that the stetric forceps was never designed to act as a compressor, but only a tractor and double lever. Dr. Davis's implement is forged in such hion that its interior face is perfectly adapted to the convexity of se parts of the head which it touches; while the fenestræ permit siderable portions of the parietal protuberances to project as seg- nts of curves outside and beyond the fenestral openings. It uld be true to say that the instrument, when accurately adjusted on the sides of the cranium, scarcely presses the maternal tissues thin the pelvis, for the exterior curves are formed so accurately t the tissues of the mother can never touch the edges of them; that they cannot be cut by them, the surfaces of contact being erywhere broad and gently rounded. The admirable form of the l-curve or head-curve enables the instrument to touch large por- ns of the cranial surfaces, pressing them equably, not unequably: that, indeed, when the instrument is accurately applied, it would a difficult matter to do with it the least injury to the fœtus, since can scarcely slide. I prefer it for ordinary cases to all the other struments that I have seen or heard of.

Each blade of this forceps is provided with a supplementary coun- part much narrower than the principal blades, which may be use- lly resorted to in cases where, after easily adjusting the first blade, e apposition of the second blade is found to be difficult, dangerous, impossible, in consequence of that portion of the head which the ade ought to cover, being jammed with violence against the bony ll of the pelvis. Under such circumstances, a narrow blade might mit of adjustment, whereas a broad one could by no means be safely plied.

I fervently desire the Student to have a proper idea of the meaning d intention of the accoucheur in using the obstetric forceps, for his urse as a practitioner will depend much on the impressions he re- ives concerning the nature and design of the instrument. If I were ssessed of such place and reputation in the world as might give to y opinion any semblance of authority, I do not know in what manner I could exercise such authority more favorably to the interests of humanity, in this particular, than by establishing the doctrine that the obstetric forceps is the child's instrument; that the perforator, the crotchet, and the embryotomy forceps, are instruments for the mother; and that the Cæsarean operation is an operation to be performed solely for the benefit of the parturient woman.

If a woman in labor is in a situation demanding immediate delivery by instrumental means without any reference to the interests of the child, it is clear that, to lessen the volume of the cranium by perforation and extract it with the crotchet or with my embryotomy forceps, is the safest as well as the swiftest method that can be employed; and every accoucheur should prefer this method in a case exhibiting undeniable proofs of the death of the fœtus. Hence I repeat that the obstetric forceps is designed to save the child, and that the relief which it gives to the mother is but an appurtenant to it.

It is true that, in the conduct of a labor, the accoucheur shall often come to the conclusion to deliver with the forceps on account of some excessive pain, inability, or danger to which the woman is exposed; and this in cases where he would not adopt the resolution from views relative to the safety of the child alone.

In this sense, then, the Student might reply that the forceps is the mother's instrument; to which I answer, nay, but it is the child's instrument; and I select it for my operation only because it makes the child safe, which could not be were I to use the mother's instruments—to wit, the perforator and the embryotomy forceps. I dare not to use the mother's instruments in contravention of the rights of the child, but I may with the child's instrument relieve the mother, and save her, while I do it no injury.

If the Student should take his impressions of this duty from studying the English books of midwifery, he will go into the world believing that the obstetric forceps is the mother's instrument, and he will use it for her, and for her alone; whereas, should he adopt the views above set forth, and which I deem to be perfectly sound and practical, he will enter upon his career feeling and knowing that he possesses an apparatus with which to rescue the child when in danger; and he will employ the instrument as often from indications relative solely to the child, as from indications relative solely to the mother; and he would, *cæteris paribus*, become a better accoucheur than the European Student, who, it seems to me, does not know more clearly than Chamberlen himself did, that the forceps is really designed for the rescue of the child. He will save more lives; for he will rescue many an infant that but for such intervention would be stillborn; and he will save many a mother, who in Europe is allowed to test the spontaneous power up to a point at which embryotomy becomes indispensable to save the mother, a point at which she too often begins irrecoverably to sink.

The obstetric forceps is designed to be applied only to the cranium; it should never be applied to the pelvic extremity of the child.

The blades are to be applied to the sides of the head, the extremities of them passing up nearly as far as the chin. (See again Fig. 124.) They may be applied to the head in occipito-anterior and in occipito-posterior positions of it, and also in the transverse positions which it sometimes assumes. They may also be applied to the head in face presentations, whether the chin be to the pubis or to the sacrum; and their consummate conservatism must be frequently appealed to, for the succor of the child, in pelvic presentations in which the head cannot be extricated by the hand alone.

When properly adjusted in a suitable case, they give to the surgeon complete control over the progress of the labor.

I have said that the forceps is not a compressor, but merely a tractor; I might have said that, while it is a tractor, it is also a double lever.

In order to get a good idea of the lever-like action of the forceps, let the Student endeavor to deliver the fœtus on the machine; and, for this purpose, let him employ a Baudelocque or French forceps. Having grasped the head, let him take hold of the blunt-hook of the left hand branch, and pull by that alone; and, as he pulls, very gently move the hook towards the left side, and having carried it far enough over in that direction, let him take hold of the blunt-hook of the right-hand branch, and pulling gently, or even merely holding on enough to keep the clamp of that branch from sinking into the pelvis, if he carries the handle over to the right side, he will find what is meant by, and what is the great and efficacious power of the lever-like operation of the forceps when drawn from handle to handle; for, as he carries the hook to the right, the blade of the other half of the forceps will be seen to emerge a little from the pelvis; and so, by alternating the lever-like motions, he will at last find that the forceps is withdrawn wholly from the pelvis, bringing away in its clamp the head of the young child unhurt by compression.

One of the most dangerous errors relative to the forceps that a Student could take up, would be the opinion that the forceps is, in its very design, a compressive instrument. It is not so; the forceps is not a pincers, it is an extractor—it is a real *tire-tête;* and I think it ought to be established as a principle in obstetrics, that, where there is not space enough for the descent of the head without the forceps there cannot be produced a due proportion by merely squeezing the head down to the required dimensions by such an instrument. If, however the Student will hold such a disproportioned head firmly with the cochleæ, and draw it downwards, the pelvis and the tissues may wire-draw it so as to enable it to pass the too narrow apertures or canal. An ounce of gold may, by a certain force, be *drawn* through the hole in a wire plate; while the force, a million times multiplied, could by no means *drive* it through from the opposite side of the same wire-plate. Lest, however, I might by the above give a wrong impression of my views, it is needful that I should state, that a head, by long pressure of the pains, may sometimes be so moulded and reduced in diameter as to pass through a pelvis smaller than the head was at the commencement of the travail; whenever, therefore, the pains cease, or are insufficient to reduce it, the forceps, used as an extractor, may assist to that end by wire-drawing it; they should never squeeze it merely to compress and diminish its dimensions; they should always embrace it firmly enough to hold on and draw it down, so that the passages may mould it as it descends.

The celebrated Baudelocque, in order to learn, by inspection, the effects of direct pressure by the forceps, procured nine stillborn children, and, by moulding their heads in the hand, restored them to the natural shape. He also procured three forceps of the very best quality, and as nearly alike as possible; he then applied the instruments over the parietal protuberances and squeezed the heads until the handles were brought into contact and tied firmly with a string, so that each head might be accurately measured while under the compression and then compared with its dimensions before the instruments were applied. Such was the force employed in bringing the handles into contact, that the instruments, though very choice ones, were all spoiled by the experiment. These excellent experiments, for the particulars of which I refer the Student to *L'Art des Accouchemens*, Part IV., chap. i., are commented on by Baudelocque as follows:—

"It may be concluded from these experiments: 1st, that the reduction in size of the fœtal head included in the clamp of the forceps, differs according to the different degrees of firmness of the cranium at birth, and the more or less complete closure of the sutures and fontanels. 2d, that this reduction cannot in any case be so considerable as has by accoucheurs been supposed, and can with difficulty, and very rarely, exceed four or five lines, the instrument acting upon the sides of the head. 3d, that the degree of reduction should never be estimated from the distance remaining between the ends of the handles when they are pressed together in the act of delivering the head nor from the amount of force employed to bring them towards each other. 4th, and lastly, that the diameters which cross the compressed one, far from increasing in proportion to the diminution of the compressed one, do not in general augment to the extent of a quarter of a line, and in fact are sometimes even lessened."

The above-mentioned results, procured by so distinguished a writer as Baudelocque, ought to suffice for removing any disposition to regard the forceps as a compressing instrument, and so put us on our guard against the propensity to use it for such an object; but let it be considered that the head does not fill up the pelvis as a nail fills up the hole into which it is driven, but it is always caught and arrested by two or perhaps four points on which it is impelled, and we shall see that if we do use it to squeeze and reduce the size of the head, we shall only reduce those diameters that are already small enough, and augment those that are already too large; for it cannot be adjusted on points that are in such close contact as to constitute a real arrest. The proper view to take of the instrument is, that it is a substitute for labor pain, supplying the want of expulsive force when wholly absent, or aiding it when insufficient to effect the delivery. Impossibilities are not to be expected from it; yet in all cases where it is inapplicable, we are privileged to resort to other far less pleasant means.

It is common to apply the forceps to the head, only, after it has got fairly into the excavation, and the nearer the head is to the external organs, the more easily may the instrument be adjusted. Hence, in the management of a labor, though we may perceive the signs that indicate the use of instruments, we feel at liberty to wait until the presenting part can take an advantageous position, preferring to lose a little time, for the sake of greater facility and assurance of safety. Whenever the head has sunk so low as to get the vertex just under or behind the sub-pubal ligament, we experience little difficulty in placing the branches, successively introduced, in their proper positions, because the rotation being completed, the bi-parietal diameter does not occupy the entire transverse dimension of the pelvis; but when we have to apply it before rotation has taken place, there is great difficulty in getting either the first or the second branch directly over the side of the head; and when we fail to adjust the branches accurately in opposition, we either cannot make them lock, or we lock them in such a way that one edge of the instrument contuses or cuts the part of the scalp or cheek on which it rests, leaving a scar, or actually breaking the tender bones of the cranium, while the other edge cuts the womb or vagina by its free and projecting curve—in fact, the forceps is designed for the sides of the head; and if, under the stress of circumstances, we are compelled to fix them in any other position, we always feel reluctant to do so, and look with painful anxiety to the birth, to learn whether we have done the mischief we feared, but which we could not avoid.

I ought to mention, that cases occur in which the forceps seems to be clearly indicated, but in which, on trial, we cannot apply them; the size and position of the head being such that we cannot by force or dexterity get the blade of the instrument betwixt it and the bony wall; in such a case skill and judgment ought to be employed, and when we cannot succeed, we must be content to know that we cannot, and that no one else can. Further, we can sometimes adjust the forceps perfectly, but cannot effect the delivery, because the parts are too small. Here, also, we ought to suffer no feeling of mortification to vex us for want of success; we should feel assured that we have exerted a sufficient degree of strength and dexterity; and being satisfied that our duty has been in so far done, we lay aside the forceps to resort to ulterior measures.

The forceps cannot be applied unless the parts are favorably disposed; for instance, the os uteri must be dilated and gone up over the head. The vagina and perineum also must be in such a condition that we need have no fear of lacerating any of those parts; else, the operation is contraindicated. A man shall hardly be justified who inserts his forceps within the os uteri. He must wait until the circle has risen above the parietal protuberance and can no more be felt.

Either the pains must have been proved insufficient for their office, or else the exigent demand for delivery, arising from hemorrhage, convulsion, or other states, must establish the indication. We should be inexcusable, if we should use them where the pains are still of vast force, and fail of success on account of a preternatural resistance. If we judge that the power of the pains is already as great as the patient ought to bear, we ought not to apply the forceps, in order to add to forces which are already of a dangerous degree of intensity.

The motive for the use of the operation should be clearly understood as referable either to the mother and child; to the mother alone; or to the child alone. The consent of responsible and interested persons should be obtained; the motives for the operation should, if possible, be clearly explained to the woman herself, and truthful, yet reasonable promises should be made to provide for her safety and comfort, both of which requiring that it be done. If time permits, some professional friend should be invited to witness and sanction the operation.

The position of the presentation should be well known; and, if needful, should be verified by the introduction of half the hand or the whole hand into the passage. The bladder and rectum should be evacuated, the latter by an enema, and the former by the catheter; the last precaution ought never to be neglected.

The bed should be prepared by bringing the end or side of it quite to the end or side of the bedstead, and then covering it with blankets and sheets of sufficient thickness to prevent the bed from being soiled. Part of a sheet should reach down to the floor, on which some cloths ought to be placed, to receive the fluids that commonly escape during the process of delivery.

The patient should be brought to the side or end of the bed, as the case may be, lying on her back, with the end of the sacrum resting near enough to the edge to admit of the most unrestrained access to the parts by the hand and the forceps. The feet should rest on two chairs or on the laps of her assistants, sitting with their backs turned to the patient, and far enough from each other to allow the operator to stand or sit between them; the patient always being covered with a light sheet or blanket, according to the temperature of the apartment.

The instruments, at all seasons of the year, should be placed before using them in a bowl of tepid water; and, when warmed, they should be anointed with sweet oil, which adheres to them better than lard.

Lastly, the parts should be freely anointed with lard.

The forceps are differently applied, according as the head is differently placed.

If the vertex present, and rotation have taken place so as to bring the point of the head just below or behind the sub-pubal ligament, the left-hand blade is to be taken in the left hand, and the fore and middle finger of the right hand should be passed upwards as far as conveniently can be done, betwixt the left ischium and the child's head, somewhat towards the posterior part of the pelvis or the left sacro-iliac junction. The branch should be held across the right groin, in a direction from above, downwards and inwards, so as to let the point of the blade be near the vulva, in which it is next gently and slowly introduced, allowing the concavity of the old-curve to be in contact with the convexity of the head. In proportion as it advances, the point is directed upwards towards the plane of the superior strait, the handle coming downwards as the introduction proceeds, care being taken to direct the point by the two fingers which guide it as far as they reach. If any obstruction or difficulty is met with, let it be overcome by gentleness and dexterity, and not by force. For example, if the point comes in contact with an ear, that organ might be lacerated by any rude force, and a great deal of caution ought to be observed in order to protect the child from such a maiming, and the medical attendant from such a disgrace. At length the blade is introduced sufficiently far to show that the point is nearly even with the chin, and the old-curve in proper contact with the side of the cranium and face, and that it covers the ear.

The end of the handle should now be depressed, so as to force the edge of the perineum a little backwards, and then given in charge to one of the assistants, while the right-hand branch is taken in the right hand, and the fore and middle fingers of the left hand are introduced into the vagina, on the other side, as in the case just described. The branch is laid across the left groin, looking from above downwards and inwards, and the point of the blade is passed into the vagina above the first branch. This one should also be at first directed towards the sacro-iliac junction of the right side, and elevated as it proceeds so as to be brought at last into exact opposition to the left-hand branch. If any difficulty occurs in bringing it forwards enough, the two left-hand fingers that are guiding it will serve to slide it edgewise into the proper position. The branches are now to be joined at the lock; and the union of the branches is very easily effected if the opposition of the two counterparts is accurate. If the opposition be inaccurate, the locking is impossible, and ought not to be effected by force. When locked, let the handles be brought near enough together to make sure that the head is firmly grasped, and then the instrument is to be withdrawn a little, in order to effect its complete adaptation to the convex surface of the cranium, which it grasps in its jaws.

If the handles come not near enough into contact, that circumstance proves that the head is not properly seized; and nothing further should be done until the error is corrected. If they gape more than an inch and a half at the ends, they are not adjusted upon the parietal bones; but are obliquely set on the frontal and occipital regions. They ought to be a little more than an inch apart at the ends.

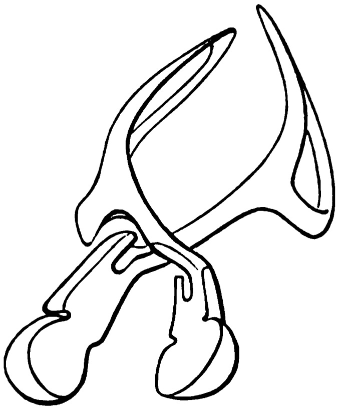
Whenever, during the process of introduction, a pain comes on, all action ought to be suspended until the pain has ceased. If this precaution be not observed, there is danger of contusion, or laceration by the blades of the instrument.

It frequently happens that the first or left-hand blade passes readily up to its proper position, and takes its place on the side of the head and face, without causing the least disagreeable sensation or the smallest embarrassment to the accoucheur; but, when he attempts to put the other blade into position, he either fails to insert it as deep as the first one, or, having done so, finds himself baffled in every effort to lock the joint.

The first blade has perhaps taken up so much space as to have thrust the head strongly over against the right side of the pelvis; leaving no passage betwixt it and the cranium along which to make the second blade glide.

Upon the failure, after fair trial, both of the counterparts should be withdrawn. Perhaps a new pain may now succeed in forcing the presenting part a little onwards; or, perhaps, after wholly withdrawing the right-hand branch, the surgeon may succeed in using the left blade as a vectis to bring the head into a better attitude; so that, when the attempt to adjust the clamps is renewed, no difficulty is found to remain. He shall often succeed in adjusting the right-hand blade as a vectis, when he shall have withdrawn the left-hand blade.

Fig. 125.



When the two parts of the instrument are introduced far enough, they may have been so imperfectly adjusted that the concave edges of the new curve may be almost in contact, while the convex edges divaricate very much, the ends of the handles having their flat surfaces obliquely placed, as in Figure 125. Let the Student carefully examine this figure, and learn from it how to comprehend the meaning of this *obliquity of the manubria* which is difficult to understand without such explanation. It is not necessary for me here to make another figure, to show that, if the obliquity of the flat-faces of the manubria should be the reverse of what is here seen, it would be because the convex edges of the new-curves are too near, and the concave edges too far from each other. The instrument could not hold in such a position but would slip off behind, or in front, and destroy the vagina. This could not happen except where the accoucheur has placed the instrument too near or too far from the coronal surface of the head. An inexperienced person is very apt in this case to suppose the very reverse, or that he has placed the concave edge of the new-curve too far from the pubis and too near the sacrum; whereas, it is really too near the pubal and too far from the sacral region of the excavation.

If he makes this mistake, which he will be apt to make, he would do well to remove the blade entirely, and give himself time to reflect anew upon the position of the child's head, and the relation of its right and left ears to the pelvic walls. In this way, having mastered the topography of the case, he will be likely to succeed upon renewing his attempt. It would be far wiser and far more charitable to do so than to make a barbarous and most unjustifiable endeavor to extract with forceps oblique and not in apposition, which they never can be when not opposite to each other.

Should he now succeed in making the adjustment, the handles will point parallel to the left abducted thigh in vertex labor in the first position, the head incompletely rotated; or, *vice versâ*, to the right thigh; but, when rotation is complete and extension begun, they will coincide with the mesial line of the trunk. In proportion as the extension of the head makes greater progress, the handles rise upwards towards the woman's belly, for the head, bringing the forceps along with it in its descent, must pass out in coincidence with Carus's curve. The end of the handles in rising describes that same curve with a greater radius.

The instrument being now adjusted over the sides of the child's head, as in Fig. 124, let care be taken, before proceeding, that no external part be caught or pinched by the lock or joint. This is ascertained by passing the fingers round and within the orifice of the vulva. In general, no attempt to extract should be made until pain or tenesmus comes on. When the woman is ready, let the handles be held in the left hand, the middle finger of the left hand being placed in front of the joint or crossings, to assist in the extraction, while the index finger is pressed against the child's head, and *always* retained in contact therewith, during the extractive effort. The finger ought *always*, in this state, to touch the head; but if it leaves it, it is only because the blades are slipping off, in which case traction should cease until they are adjusted again. While the finger remains in contact with the head, there is no slipping of the instrument. It is shameful to let the forceps slip off the head and fly from the vulva with a suddenness sufficient to lacerate the parts. An operator ought to be turned out of doors, as soon as he allows so scandalous a misdemeanor to occur from carelessness or ignorance.

The most successful mode of using the instrument at first is to employ it as a lever, by moving it from handle to handle, exerting at the same time enough extractive force to prevent the opposite blade from plunging deeper into the parts, while we move the handles to the right, or the left.

In exhibiting to my Class a demonstration of the lever-like action of the forceps, after having adjusted the instruments on the head, in the phantome, I take hold of the blunt-hook of the left-hand branch, and, leaving the other untouched, carry it (the left hand handle) over towards the left thigh; in this action, the blade of the right-hand branch is found to be withdrawn considerably, bringing the head along with it, while the blade of the left-hand branch does not emerge at all. I next take hold of the blunt-hook of the right branch, and, drawing a little downwards, I carry it over towards the right thigh of the phantome, by which the blade of the left branch is withdrawn in like degree, bringing the head, which it grasps, along with it; so that, by several successive movements of the sort, the head is soon found to emerge completely from the vagina. It should be observed that, while I carry the left-hand branch to the left side, I do not allow the right-hand cochlea to sink deeper into the vagina, but keep what I have got with it, and then draw out an eighth or a fourth of an inch of its fellow, and *vice versâ*. It is clear that if I successively get out an eighth of an inch of the right-hand, and then an eighth of an inch of the left-hand branch, keeping all I gain, I must in the end have drawn out the whole of the clamps, in which will be found the head. The problem is to adjust the forceps on the child's head, and then extract the forceps containing that head. Hence, get out one-eighth of an inch of each blade in succession by using its fellow as a lever and tractor. One trial of this method on the phantome will show the Student how powerful is the action of the forceps used in this way, for as one blade emerges, the other does not re-enter the passage.

In practice, all attempts at extraction ought to be made in conformity with the natural processes and dispositions or tendencies of the healthiest labor: there ought to be no hurry, no impatience, no temper exhibited by the operator.

In natural labor, there are intervals of rest; in artificial labor, there ought also to be good intervals of rest; which are required both for the physical relief and the moral relief of the patient. Her mind is strained up to the highest tension, by the mere thought that she is under the operation, and the tissues against which we are dragging the child yield better for a minute or two of rest, repeated from time to time, as the case admits or demands: nature gives pauses, so should the surgeon.

It should not be forgotten that the forceps embraces the head in a direction from the vertex to the chin; nor that, when the head is evolved under the stress of the instrument, it ought to undergo the same mutations as it would if expelled by the natural pains. Hence, as the vertex emerges, and rises towards the front of the pubis, the ends of the handles must be permitted to rise along with it. They must never be prevented from taking the direction which the extension of the head, directed by the resisting perineum, naturally tends to give to them. In the last moments of the delivery of the head, during its *extension*, the inferior part of the occipital bone rests in contact with the mons veneris. If the forceps is still upon the head, in this situation, its handles will almost touch the abdomen of the mother.

A goodly proportion of the examples of forceps operations met with here, are, as I think, rendered necessary by rigidity of the soft parts, to overcome which, the expulsive faculties have been exhausted by vain efforts. Let it be borne in mind that, though the expulsive powers of the womb are enormously great, they sometimes fail of success because the vagina is not dilatable, or the perineum will not yield, or the labia will not suffer elongation; or all these obstacles may be in combined opposition to the delivery: remembering these things, we should not impatiently urge nature beyond her powers, lest we do injury where we are most solicitously endeavoring to do good. By rude and untemporizing exercise of strength, we incur great hazard of rupturing these organs, and of maiming the patient most injuriously, while we bring our art into disgrace. It is very true that the forceps acts as a dilator by separating the sides of the vagina and vulva before the advancing head; but, on this very account, and because it is so powerful a dilator, we are bound to exercise the greatest prudence in the use of it. I have, in many instances, refrained from the use of the forceps, where they were, on other grounds, strongly indicated, because I could appreciate the unreasonableness of any attempt suddenly to dilate the external organs, which I perceived to be far more frangible than dilatable.

It happens that, where the head has suffered a long arrest, and the natural powers have proved incompetent to its advancement, the application of the forceps, and moderate tractions with the instrument, will put it in rapid motion, so as to leave no doubt of its speedy expulsion under the natural powers. In such cases I have been accustomed to remove the forceps, and allow the child to be born by the spontaneous exertions of the womb. I do this with the view of sparing pain to the mother, and because the organs are less likely to suffer contusion or laceration without, than with, the instrument. But this ought not to be done except under full conviction that the expulsive powers, thus set in renewed activity, will be successful, since it is very mortifying to withdraw them prematurely, and be obliged to re-apply them.

Inasmuch as we cannot exert any very considerable tractile force, without compressing the head with a severity proportioned to it, we should occasionally relax our hold on the handles, in order to let the blades cease from pressing the cranium. The effects of the pressure are rendered less dangerous for the child, by being occasionally intermitted. The same reasons are conclusive against the practice used by some persons, of tying the handles with a fillet, which makes it impossible to relax the grasp of the clamps, without the trouble of untying the fillet every time such relaxation happens to be thought of.

Extreme caution is required for conducting the last stages of the operation with safety. The perineum should be well supported with a napkin held by the operator or his assistant; and the delivery of the head should be deliberate and slow, and the patient exhorted to lie as still as possible. In delivering a lady rather advanced in life of her first child, I was using a moderately strong traction while the head was passing out. On a sudden she threw up the pelvis, which changed the line of movement of the head. It was moving along Carus's curve, and as I had the handles of the forceps pretty firmly grasped during the muscular efforts I was making, I could not let go soon enough to prevent the head from lacerating the perineum very severely, by departing and moving off in a tangent of the curve. I felt then, and still do feel confident, that the perineum would not have been torn but for the unexpected and violent movement of her pelvis. She recovered from the effects of the laceration in about three weeks.

As soon as the head is delivered, the forceps should be removed and handed to an assistant, while we take care to attend to the delivery of the shoulders, and finally receive the child, which is to be done as in the most natural labor.

To apply the Forceps before the Rotation is completed.—A more difficult operation than that just described is the application of the forceps where rotation of the head has not taken place.

The first, and one of the most important steps here, is to ascertain accurately—I say with absolute accuracy—the situation of the fœtal head. If the finger can reach the posterior fontanel, we ought to be able to appreciate, from that point, the relative situation of all the other parts of the cranium. If any doubt, however, remains after an attempt to discover the truth by the employment of the finger alone, the whole or one-half of the hand should be introduced into the vagina, so that, by grasping the cranium with several fingers, we may become positively sure that our diagnosis of the position is correct. We will suppose the examination to have resulted in ascertaining that the vertex is in the first position, *i. e.* directed to the left and front wall of the pelvis.

The patient is to be placed upon the back, as in the other case; and the point of the left-hand branch of the forceps, guided by two fingers of the right hand in the left posterior part of the vagina, is to be passed upwards in front of the left sacro-iliac symphysis. The end of the blade being conducted up to the child's chin, it will be found that the pivot of the blade will look upwards and to the left, and the handle will be inclined towards the left thigh. The blade being properly adjusted, an assistant should be put in charge of the instrument while the right-hand branch, guided by two fingers of the left hand, is next to be introduced into the right and lower part of the vagina, and gradually swept forwards along the side of the head to the right side of the chin, so as to cover the ear; the notch being just opposite to the pivot. If the blades should not be found opposite to each other, they will not lock; they must be placed in opposition by bringing one of them more to the front, or by pushing the other more towards a lower part of the sacrum; and, when they come to press upon the opposite sides of the head, there is no difficulty in uniting them. When the branches are locked, they incline towards the left thigh of the mother, the pivot still looking upwards and to the left, and the handles having an appearance of awkwardness in this situation, which, to a tyro, communicates a feeling of doubt as to their being well placed. They look as if they were crooked, but this very awkwardness is the best evidence of their being situated right.

When ready to proceed with the extraction, advantage should be taken of the first pain, not to rotate the head by twisting the vertex to the right, but by moving the instrument from handle to handle, using at the same time a proper degree of traction. The rotation takes place as the head advances, and the vertex soon comes under the pubic arch, without any particular effort being made to rotate it. As soon as the vertex reaches the pubis, the peculiarities of this application of the forceps cease, and the remaining steps proceed as in the first-described case.

The vertex may present in the second position, in which case the posterior fontanel is towards the right and front of the pelvis. Let the woman be placed as before: after introducing two fingers of the right hand into the left side of the vagina, the left-hand branch of the forceps is to be conducted into it towards the fourchette, the point of the blade sweeping upwards towards the child's chin, covering part of the ear, and coming off at the vertex. The handle will look towards the right thigh, and the pivot will point upward towards the right. The handle of the forceps should be very much depressed in this case, because, as the lock portion of the branch is inclined towards the right it leaves scarcely space for the introduction of the female counterpart, to be introduced on that side; but a considerable depression of the handle affords more space for the purpose. The branch being correctly placed, is put in charge of an assistant, while the right-hand blade, being guarded by the introduction of two fingers, is passed into the vulva at its lower or back part, and its point turned upwards towards the left, as the handle sweeps downwards towards the right. The joint is brought into apposition and locked.

As soon as a pain comes on, traction, combined with the lever-like motion, must be instituted, and as the head descends, the mechanism of the pelvis compels the vertex to rotate towards the pubis, under the arch of which it soons begins to jut. This being effected the peculiarities of the operation are removed, and its remaining conduct is to be fulfilled as before.

Forceps in Occipito-Posterior Positions.—In those cases where the vertex, instead of coming to the arch, rotates backwards and falls into the hollow of the sacrum, the forceps will be more likely to be required, because the difficulties of expulsion are greatly enhanced by the position. In this, just as in all the occipito-anterior positions, the vertex must escape first, notwithstanding it is directed backwards towards the sacrum; but, in order to do so, it must glide down the sacrum and coccyx, and along the perineum, after having distended it enormously, until the fourchette slides backwards and upwards behind the occipital bone of the infant. In order to effect this, the occipito-mental diameter of the fœtus must become parallel with the axis of the inferior strait, or at least it must become nearly so. Such, however, is the violence of the flexion required for that purpose, that much time is lost before it can be obtained, and in many of the instances the woman is exhausted, and the pains gone, before it can be accomplished.

The position is ascertained by feeling the large fontanel behind the pubis, or just within the arch, while the sagittal suture runs backward towards the sacrum.

When it is found that the forceps will be required to extract the head, let the male branch, held in the left hand, be introduced into the back and lateral part of the vagina, and conducted towards the chin as far as possible, carrying the instrument up near the left sacrò-iliac junction at first, and gradually bringing it forwards so as to apply it accurately to the side of the head. The oblique diameter of the head dips so much towards the sacrum, that it is impossible to embrace the head properly without depressing the handle very much, and thrusting the edge of the perineum very far back, which, though a little painful, cannot be avoided; otherwise, the head will be grasped coincidently with its perpendicular and not its oblique diameter. The instrument being held in this way by an assistant, leaves a sufficient space on the right side of the vagina for the introduction of the female branch, which, being adjusted and locked with the male branch, leaves the handles very much depressed.

Having ascertained that none of the external parts are pinched at the lock, and that the head is surely grasped, the first movement in extraction should be to raise the handles up a little, with a view to compel the chin to approach still nearer the breast, and make the vertex to glide down the sacrum and coccyx, assisting its descent by means of the lateral or lever action of the forceps: the intention of the operator should be to draw the vertex off the sacrum, off the perineum, off the fourchette, and then let the head extend backwards on the outside.

As the perineum in this labor must be enormously distended, it behoves that great care and patience should be exercised, lest it might give way. It should be well supported, and, as soon as the vertex clears its edge, the handles ought no more to be raised, but on the contrary, depressed, to let the vertex go backwards — a movement exactly the reverse of what takes place in the occipito-anterior position. The head being delivered, the shoulders rotate in the excavation, and the right or the left one comes to the pubic arch, so that the rest of the process is concluded as in a first or second position, except that the front parts of the child, instead of the back parts of it, come out towards the front of the pelvis, which makes no difference of any import.

The application of the forceps for the occipito-posterior position, say the fourth or fifth, where rotation has not taken place, is more difficult than the one just above treated of. The blades are with much less facility applied, and, indeed, cannot take hold along the oblique diameter so completely as is to be desired; they rather seize the head along its vertical diameter at first, and are gradually brought into parallelism with the oblique one, as extraction proceeds. Reflection upon this circumstance is very needful at the time of the operation, lest the infant's head should be contused and ground, and even cut by the blades.

The introduction takes place as in a first or second position, the fourth corresponding to the first, and the fifth to the second. The handles must be well depressed in this case, and it will be allowable to make prudent efforts to rotate the vertex into the hollow of the sacrum —it being always understood that all hope of bringing it to the pubis has, after experiment, failed.

Forceps in Transverse Positions.—The head is sometimes situated transversely, the vertex resting against one, and the forehead against the other ischium. Let us suppose the vertex at the right ischium, and that it is intended to apply the male blade to the left side of the head, with a concave edge of the new-curve looking towards the occiput.

Therefore, let the left-hand branch be introduced into the left posterior part of the vagina, and, as the point enters more and more, the handle should be depressed, until the curve applies itself on the left side of the head in a direction from the vertex to the chin, or as nearly so as may be practicable. It should be understood, however, that the blade will scarcely apply itself in that direction, because the chin is not so near to the breast as it ought to be. When the blade is adjusted, its pivot looks to the right, and lies in a horizontal position, while the handle juts out obliquely towards the right thigh, which is much abducted.

As the left-hand branch projects towards the right, there will be some difficulty in finding room for the introduction of the right-hand branch; yet the first one can be temporarily pushed out of the way, so as to let the point enter at the inferior right side of the orifice of the vagina. When the curve is applied to the convexity of the cranium, it must be pushed upwards, backwards, and towards the left, so that its point may approach the chin, and the notch be brought in apposition with the pivot, and so locked. The head, being firmly held, may be moved in a direction from handle to handle, and moderately rotated, so as to dislodge it; and the tractions being commenced, it is found to descend, the forceps rotating along with it, until the pivot becomes vertical, and the fontanel appears at the arch.

In all the operations I have described, the male or inferior blade is to be first introduced, otherwise the female or upper blade cannot be introduced without getting it below the inferior blade. There is one position of the head, however, in which it is proper to introduce the female blade first—and there is but one—which I shall proceed to treat of: it is that in which the vertex touches the left ischium, and the forehead the right ischium.

It is clear that, when the instrument has grasped the head in this position, the handles will project very much towards the left thigh in strong abduction; but if we introduce the male blade first, inasmuch as its handle will project towards the left thigh, it will occupy all the space on that side, and prevent the insertion of the second branch, for there will be left no place for the handle to be depressed in. To avoid this difficulty, therefore, take the female or upper blade in the right hand, and introduce it into the posterior and right side of the vagina, conducting its point as near as may be to the chin, and over the face to the right side of the head behind the pubis, leaving the handle to project towards the left thigh. Next, take the male blade into the right hand, and, turning the concave edge of the new-curve downwards, insert the point into the right side of the vagina, below the female branch. Let the fœtal face of the clamp apply itself to the convexity of the head, and slide it onwards, and, in proportion as it enters, make it sweep round the crown of the head towards the back of the pelvis. In effecting this, the handle comes gradually down as the clamp gets on the left side of the cranium, and at last the lock is found to be where it ought to be, namely, under the upper or female blade, with which it is then to be locked.

When we have ascertained that the head is properly held, or grasped, we may proceed, as before, to move and to attempt to rotate it, and then deliver when the vertex emerges from beneath the symphysis pubis.

The Forceps in Face Presentations.—Among the sixteen thousand four hundred and fourteen women delivered at the Dublin Hospital, under charge of Dr. Collins, thirty-three had face presentations, and four of these had stillborn children, which is a little less than twelve per cent. of mortality in this labor. I have said enough in my observations on Face Presentations, at page 377, *et seq.*, to make it unnecessary for me to repeat anything here in relation to the difficulties of that sort of birth. It is merely necessary to remark that the forceps, when their use is indicated in this labor, must be applied to the sides of the head by carrying the points of the blades nearly up to the vertex. In those examples in which the chin comes to the pubis, the handles need not be very much depressed; but in those in which the top of the forehead is at the pubis, the handles must at first be very strongly depressed, and, as the case proceeds, they must be strongly elevated, so as to get the chin down to the fourchette, over which it must slip, and then begin at once to approach the breast again, in the act of flexion. As soon as the chin is free, we allow the handles to descend again, while we continue the traction until the head is completely emerged. I shall take this opportunity to state, that I conceive it impossible to have a better instrument for this particular labor than Davis's forceps, as made by Botschan, 35 Worship Street, London. It holds the head as in a basket, and is far less likely than any other with which I am acquainted, to bruise or in any way injure the child. Figures 80 and 83 show the difference between a face case, in which the chin comes to the pubis, and one in which the forehead is there, and also the manner in which the head is to be taken hold of by the forceps.

The Forceps in Locked Head.—The head is said to be *locked*, whenever two opposite sides of it are caught by two opposite sides of the pelvic wall and held so firmly that it can descend no lower, and either cannot, or cannot without great difficulty be pushed upwards again into a freer larger space. In general, when the head is thus locked, it is in its transverse or bi-parietal diameter, one parietal protuberance being held at the pubis, and the other at the projection of the sacrum. Supposing the pelvis to be only three and a half inches in its antero-posterior diameter, and the head to be three and three-quarters in its smallest diameter, then it might happen, as it does in fact happen, that the cone of the head should be driven, by the force of the long continued pains, into the narrow pass, the delicate bones of the head giving way, and becoming indented under the pressure of the promontory of the sacrum, and moving downwards until it becomes immovably fixed by the opposing points of the pubis and sacrum. This state would constitute what is called a locked head. Many evils result from this locking of the head. For example, the woman, after vain efforts and great sufferings, becomes feverish, and loses her pains altogether; or a state of constitutional irritation comes on, marked by a frequent, small pulse, coolness of the extremities, sunken cadaverous appearance of the face, delirium, jactitation, and vomiting, which, if not soon relieved, are followed by death, hastening with rapid strides to end the strife. The pressure destroys the child; or it produces gangrene of the parts of the mother that are compressed, or causes inflammation to take place, succeeded by sloughing and its consequences. Or, the urethra, being effectually compressed betwixt the cranium of the fœtus and the symphysis pubis, a total suppression of urine takes place, followed by its very serious consequences; or, lastly, the soft parts, perhaps the vagina, or possibly the womb, from being pinched as above stated, may give way during a pain, and the laceration, once begun, may extend so as to allow the child to escape into the peritoneal sac.

Whenever, then, the head is found to be so situated that it will neither advance nor retreat, it may be said to be locked, and the case ought to command the greatest care from the medical attendant.

It is manifest that, if the arresting points of the pelvis touch the head at its parietal protuberances, no possibility exists of applying the forceps in that direction; there is not space enough to admit of the blades, and if they are to be applied to the head, it can only be on those parts that are free from great pressure, as the forehead on one side, and the occiput on the other; and this must be done notwithstanding any fear of contusing the face, of which there is some risk, but which very risk becomes less the more it is borne in mind.

When the attempt to deliver is about to be begun, the forceps should be well pressed together, so that, when the lever-like movement takes place, their blades may not be allowed to slip or slide on the forehead, which would thereby be liable to excoriation, or even to be deeply cut by their edges, formed, as is well known, for application to a convexity different from that of the face. The motion from handle to handle, assisted by a sufficiently powerful traction, will, ordinarily, succeed in disengaging the head, and getting it down into the excavation; upon which the blades ought to be removed, and, if the pains prove strong enough, they need not to be reapplied; but, in the lack of a proper force, they should be adjusted anew, and on the sides of the head, for which their curves were fashioned, and to which only they are really adapted.

In making compression, let it be carefully remembered that the compression is not designed to diminish the diameters, but only to hold the object more securely or steadily: any amount of compressive action beyond this indispensable one is mischievous, as tending to augment the difficulty by forcing the parietal protuberances more decidedly against the arresting points. I succeeded by this means in drawing a head through a pelvis so faulty in its antero-posterior diameter, that I could readily touch the sacrum, by introducing only the forefinger into the vagina. The patient was a very small woman of color, to whom I was called in consultation by a young medical friend; the child was dead, but not injured by the instrument. So great was the difficulty, that I at one period entertained very seriously the idea of performing the embryulcia. If I had known the child to be dead, I should have greatly preferred to do so.

In these cases, the operator, who alone can estimate the degree of force he employs, is the sole judge as to whether that force is too great be compatible with the safety of the woman: should he, upon a e consideration of it, deem it wholly unsafe to proceed, or imprac- able to succeed by any legitimate exertion of his strength, there re- ins the resource, sad as it is, of the perforator. Now that we have advantage of the stethoscope, we can with great certainty, deter- ne the question of the life or death of the fœtus in utero: and ere we find, upon auscultation, that its life is extinct, we need have t little hesitation in applying the perforator, in order to reduce the e of the skull by extracting its contents. In doing this, however pleasant the operation, we remove much of the danger arising from urther continuance of the pressure on the soft parts of the mother. case the stethoscope reveals the fact that the fœtus is still living, we ould feel constrained to wait so long as to overstep, perhaps, the undaries of prudence.

But it does not always happen that the head is locked in the direc- n and situation above pointed out. The vertex may be jammed wn behind the pubis, and the forehead in front of the promontory. re the forceps can be legitimately adjusted; and they admit of the plication of a greater force, and it will be probably found less diffi- lt to unlock and rotate the head, in consequence of the greater con- xity of the points of arrest. Some degree of rotation ought to be ven to the head by means of the forceps until they succeed in get- g it down into the excavation, whereupon the vertex may be rotat- back again to the arch of the pubis, and so withdrawn.

Impaction of the head cannot take place at the superior strait; the rm of that opening is such that its heart-shaped circumference cannot filled by the head of a child; there would always be found a part of in which not only the blade of a forceps, but a couple of fingers, uld find passage; but after the head has sunk below the strait, the nical figure of the excavation perhaps admits of its whole circum- ence being occupied by the head, which fills it up completely, and completely that the forceps can find no space in which to pass. t the attempt, however, be made, and in every unavoidable case, ere it fails of success, the head can be opened, and the skull made collapse.

The Forceps in Pelvic Presentations.—It only remains for me relate the manner of applying the forceps in breech or footling ses, wherein the head refuses to come away after the shoulders are livered. I have already said, that it is my invariable rule to have e forceps in readiness, in every instance in which I discover that the ad is to be the part last born.

When the instrument is wanted for such a use, it is wanted suddenly—immediately; and the medical attendant fails in his duty, who finds himself in want of forceps for this purpose, and is obliged to send for them; for a child perishes while a messenger is going a hundred yards, or putting on his boots.

There is no need of my going again at length over the causes that render the forceps necessary on these occasions. It is enough to know that the expulsive powers are wanting, either from disproportion, from cessation of efforts both voluntary and involuntary, or from mal-position, and that if the head continues undelivered but a few minutes, the child is lost.

Supposing that the shoulders are delivered, and the face in the hollow of the sacrum; let a napkin be wrapped round the body of the child, including the arms, which should be placed against its sides, so as to keep them out of the way. Then, giving the body to an assistant, let it be held by the thighs or hips, in a position nearly perpendicular, so as to press the nucha against the arch of the pubis; or its back may be carried over nearly into contact with the mother's abdomen, to get it out of the way. The left-hand blade, guided by two fingers of the right hand, is then to be passed in at the left side of the vagina and applied to the head, covering it in the direction from chin to vertex. The right-hand branch is next introduced, with similar precaution, into the inferior and right side of the vagina, and so conducted on to the head as to embrace it from chin to vertex. As soon as the instrument locks, the tractions are to be commenced, and there will be, in general, little delay in the extraction, if the handles be raised as the head emerges; they requiring to be elevated, just as is needful in the delivery of occipito-anterior positions. If an accoucheur should attempt to perform this operation for a patient in any other than the dorsal decubitus, he would find himself greatly embarrassed.

But, if the child be unfortunately born with the toes towards the pubis, and rotation in the subsequent stages cannot be effected, so that the face remains uppermost; if, in this case, vain attempts to deliver by the hand have been tried; then, let the woman lie on her left side, with the thighs strongly flexed; let the child be turned back as far as it can be done with safety to its neck, so as to bend the neck very much backwards. By giving to it this position, the forceps can be introduced in front of the child, the left-hand branch being first passed up on the left side of the chin and carried as far as the vertex; while the female branch is introduced upon the opposite side so far as to allow of its being locked with the pivot. As soon as the head is properly seized, let it be drawn downwards in such a direction as to cause the chin to emerge under the arch; to which end, let the handles be at first somewhat lowered.

Where, however, it can be effected with proper celerity, it is better, for this application of the forceps, to bring the woman to the edge of the bed, and, allowing the perineum to project beyond it, cause her feet to be supported in the usual manner. The child, wrapped in a napkin, can well be intrusted to a kneeling assistant, as it is held nearly in a vertical or standing position. In this way the branches of the instrument have free access to the left and right sides of the vagina, and lock with the greatest ease in front of the throat. Except in such a position of the woman, I cannot conceive how it would be practicable to use the long forceps; but Haighton's or Davis's forceps could be applied while on the side, though not so easily as on the back.

Section of the Pubis.—I have little to say here in regard to the operation of Symphyseotomy, commonly called the Sigaultian section —an operation which was proposed and performed by M. Sigault, in the year 1777.

The proposition to increase the dimensions of the planes of the pelvis, by cutting asunder the symphysis pubis, excited, soon after the promulgation of it, a great sensation throughout Europe, and many operations were soon afterwards performed with various success. It is probable, however, that the increase of amplitude of the planes of the pelvis is not so considerable as the friends of the section at first hoped for, and the dangerous traction of the tissues behind the separated pubes, and the gaping of the sacro-iliac junctions, one or both, were causes of ill success that have allowed it at last to fall into complete desuetude. So far as I know, the operation has never been done in this country. I feel not the least inclination to recommend the performance of it, and I refer the reader, who may feel interested in inquiring into the method, to M. Baudelocque's work on midwifery, and to the curious *Essais Historiques Littéraires et Critiques sur l'Art des Accouchemens*, par M. Sue, le jeune, Paris, 1779, 2 vols. 8vo. Dr. Churchill, in his *System of Midwifery*, p. 376, gives the statistics of the operation, as it has hitherto been done, and, in the most emphatic manner, discourages and condemns it.

Before I close this chapter, I must reiterate the expression of an opinion which I have already uttered at page 546—it is, that the obstetric forceps is the child's instrument; that the perforator, the crotchet, and the embryotomy forceps are instruments for the mother; and that the Cæsarean operation, in its spirit and intention, should be devoted absolutely to the conservation of the mother alone: in saying so, I am not insensible of the great satisfaction enjoyed by the surgeon who, under the distressing duress which should alone compel him to subject a living woman to the Cæsarean section, is rewarded with the happiness of rescuing both the child and its parent from the jaws of an otherwise inevitable grave. I hold that no man has a right to subject a living, breathing human creature to so great a hazard as that attending the Cæsarean section, from views relating to any other interests than those of the patient alone.

I believe that the Cæsarean operation ought never to be performed in any case, whether the child be living or dead, in which, under a ripe and sound judgment and perfect knowledge of Midwifery, a decision may be obtained, that delivery *per vias naturales* is less dangerous to the woman than one by vivisection.

Now, as to a question concerning the smallest pelvis through which it is possible to deliver, I think it impossible to fix a minimum aperture through which a woman may be safely delivered. Elizabeth Sherwood was delivered having a pelvis of one inch and three-quarters, and I twice delivered Mrs. R. with one under two inches; but to say that a pelvis two inches and three quarters is the lowest through which a woman can expel a child, is to speak contrary to the record. Indeed, the dimensions that render a Cæsarean section indispensable, are variable dimensions; they never can be fixed and prescribed by precept or law, for one woman may have strength and courage and endurance to enable her to bear delivery in a pelvis of one inch and three-quarters, as in Elizabeth Sherwood's case, whereas, in another woman the lapses of her strength may be so rapid, and the exigencies of her condition so urgent, that, if she be not promptly relieved she will inevitably be lost. Hence, my assertion is correct, that the dimensions demanding the Cæsarean operation are variable. If we go down to diameters of one inch and a half, or to diameters of one inch, then the question of delivery *per vias naturales* is set aside. But we may find a case in which a woman, having a pelvis of two inches and a half, ought to be delivered by the section, because, we conclude she cannot live long enough to escape by the slow process of a crotchet operation. I should not hesitate, therefore, to recommend the Cæsarean operation in a pelvis between two and two and a half inches in one case, nor would I hesitate in another case to prefer an embryotomy operation in a pelvis somewhat below two inches in its diameter.

I have been present in consultation where urgent demands and pressing arguments were in vain proffered to induce me to consent to

Cæsarean operation; those arguments were based chiefly upon the laims, or superior rights, of the child. In that case, as in all others, was actuated in my opposition to the operation by the firm opinion at the child has no positive claims whatever, if they conflict at all ith the rights of its more important parent; and I regard myself as ot guilty of inhumanity in indulging or in expressing this sentiment -and I repeat a sentiment expressed upon page 531, in the quotation om Tertullian: "*Atquin et in ipso adhuc utero, infans trucidatur neces- riâ crudelitate, quum in exitu obliquatus, denegat partum, matricidus ui moriturus.*"

It appears to me an important matter that the medical profession hould have just views as to the indications for these grave and dire- al operations. As I have great reason to think that many gentle- en, my brethren, have not given themselves time to reflect upon all he points of the indications, I am the more desirous to have an pportunity to state my own convictions in the matter, and I should e glad in the most emphatic manner to enter my protest upon the ecords of Obstetrics, against the Cæsarean operation being performed ith any other views than those relative to the conservation of the other, with the salvo always, that to save the child is a great dditional good fortune. I believe that he who performs the Cæsarean ection upon views relative chiefly to the conservation of the fœtus lies in the face of the soundest doctrine; and I cannot understand how the conscience of such an operator should ever be appeased nder the pungent reflections that must follow a fatal operation not rendered inevitable by the exigencies of his patient.

The number of cases of deformed pelvis met with in the United States, appears to be far less considerable than those met with in England or in the Continent of Europe.

CHAPTER XVI.

EMBRYOTOMY.

THE implements employed in Embryotomy, or those operations in which the body of the fœtus is cut by the surgeon, are various. They may, however, be all comprised under the denominations of: 1st, the perforator; 2d, the crotchet; and 3d, the embryotomy forceps. In cases, very rare ones, in which decapitation of the child is required, a knife of a peculiar form is to be used. I witnessed the decapitation of a fœtus forty-six years ago, in 1818, and fortunately have seen no such operation since.

Perhaps there is nothing to be met with, in the very troublesome and anxious profession of an obstetrician, more painful to his feelings than the management of a labor in which it is required to mutilate the child, to extract it from the maternal organs. It is fortunate that this odious duty does not occur very frequently; and we are indebted to the inventor of the forceps, Chamberlen, for exemption from it in the present age, in numerous instances, in which, without the important uses of that instrument, we should be compelled to resort to the perforator and the hook, which comprised nearly the sum of the instrumental resources of the ancients. We are also in modern times highly favored by a knowledge of the stethoscope and of direct auscultation, in acquiring greater certainty relative to the life of the fœtus, whose state of life or death can now be accurately determined by that means; thus relieving the mind of most painful solicitude by the certainty of its death, if that event should have happened, in cases where we are compelled to apply destructive instruments for its delivery.

When the fœtal head is driven into the pelvis and arrested there in consequence of disproportion of its diameters to those of the bony canal, if the arrest cannot be obviated by the hand, the lever, or the forceps, the mother may suffer so much constitutional irritation from the fruitless efforts she makes, and the agonizing pain she endures, as to fall into exhaustion, and perish with the child still undelivered; and this, not only in the case of a cephalic presentation, but also in that of the feet, or that of the breech—in short, in all situations where the child cannot be got away through the pelvis until after it shall have been reduced in its magnitude. But even in those instances in which the woman is not threatened with exhaustion, she is liable, from the pressure of the head, to suffer inflammation or gangrene of the soft parts, which are contused by it; or she is exposed to danger of laceration of the womb itself, or of the vagina, whose consequences are greatly to be feared, and if possible averted.

Exhaustion, manifested by cessation of the pains, smallness and great frequency of the pulse, a haggard and sunken countenance, anxiety, jactitation, coldness of the extremities, profuse viscous sweats, and delirium, may come on in labors that are drawn out too long from smallness of the pelvis, or from rigidity of the soft parts; cases in which we may clearly discern the necessity of immediate delivery, to rescue the woman from impending ruin. When such signs are present, and the child is known to be dead, if the ergot and the forceps are found, on trial, to be unavailing, recourse must be had to the most speedy means of relief, to wit, the opening of the head and discharge of its contents, with a view to the collapse of the cranium. We have less of the feeling of abhorrence above mentioned, when obliged to do this operation on the dead child; but, even in that case, we feel that our acts, as physicians, may be misconstrued by ignorant bystanders; so that, even here, embryulcia is a most unpleasant duty in practice. It ought therefore to be esteemed a duty to clearly state the condition of the child, and the urgent motives for lessening the size of its head in order that it may pass—or pass with safety to the mother.

Lessening the volume of the head is effected by the introduction into one of the fontanels or sutures, of an instrument called Holmes' perforator, the blades of which being afterwards opened, make a free incision, through which, if enlarged by a crucial cut, the cerebral contents are either extracted at once, or allowed to escape slowly under the pressure of the pains. As soon as the opening is made, it is common to push the perforator deep into the cavity of the cranium, or introduce a crotchet so as to break up the textures within, and then, seizing the head by means of the sharp hook, which is applied to any convenient situation on the outside or in the inside of the skull, to draw it through the vulva, and deliver it; after which, if the woman has not suffered too severely, she soon recovers of the effects of her preceding fatigue and distressing pains.

This is the simplest and easiest case of embryulcia, and is one that any humane practitioner would or might perform without hesitation, upon the proper grounds for the proceeding being fully set forth before him.

Yet, notwithstanding the facility with which the operation of embryulcia may be performed, it is one so unnatural, and so shocking to the feelings of all concerned, that it ought not to be done without very satisfactory reasons for it; and in general, not without consultation and agreement with a medical brother, for it is too grave and solemn a thing to exercise this professional authority as by the fiat of an autocrat. In those instances in which it becomes necessary, during the life of the child, to resort to this mode of delivery, the most formal consultation ought to be regarded as indispensable; and no consultation can be supposed properly to result in such a proceeding, except upon the most urgent and clearly understood reasons for it. There are gentlemen in the profession who boast that they never have performed this operation. It may be very true; but the reason is that they resolutely decline to do their duty, which they throw upon some not more unfeeling, but more merciful and resolute brother.

There are cases of labor occurring in women with deformed pelvis, that are plainly impracticable with an unmutilated child. For example, if a woman have the pelvis occupied with an exostosis, or if the diameters of that canal are changed and spoiled by rachitis or by malacosteon, the child contained within her womb cannot escape whole *per vias naturales.* If the promontory of the sacrum comes within two inches and a half of the symphysis pubis, the child cannot pass the strait alive, because its own smallest diameter is more than three and a half inches; and, indeed, if the pelvis have three inches of antero-posterior diameter, it cannot be born alive, unless it be uncommonly small, and moreover possessed of a very incomplete ossification of the cranial bones, and great laxity of the suture lines that unite them: such a head might, by long pressure under a very powerful womb, be at length forced down through the strait, after it should have been moulded into the proper form by the force applied to it. Yet, when we come to consider that the bi-parietal diameter is 3.88 inches, we shall entertain little hope of getting the head down, in a pelvis of three inches. Though it is true that Solayrés, and Dugés, and others have been fortunate enough to meet with cases in which the head at term has been born in a pelvis of two and a half inches from front to rear, it is not to be expected that success can attend labor in a female whose pelvic deformity even approaches to two inches and a half in its smallest line of diameter. The exceptions but prove the general rule. (See *Monthly Journal Sci.,* July, 1847, for Dr. Simpson's case.)

Such a pelvis is not fit for the forceps, since it is too small for them to be withdrawn when locked. The question must always be, in such cases, as between the perforator and crotchet on the one hand, and the Cæsarean section on the other. But this can only be considered as relative to the living child, even by the warmest advocates of the hysterotomy. Of the dead child, no question can arise as to the mode of its delivery, except that by the perforator, and whether sooner or later. The dead child must always be withdrawn *per vias naturales* if there be space through which to extract it with equal safety: but even where the child is known to be dead, we may be compelled to perform the Cæsarean operation, if we would deliver the woman at all; since deformity may reach to the degree of shutting up the passage, even against the perforator. There is, in the museum of the University of Pennsylvania, a pelvis so distorted, that the hand could not possibly have directed an instrument to the head, in a manner to enable the surgeon to open and extract it. The woman from whose remains the pelvis was taken died in the almshouse, resolutely rejecting the Cæsarean operation, and preferring to it the death which she knew to be inevitable.

The practitioner who may be in charge of a case of labor where embryulcia is indicated, must be guided by his judgment and the counsel of his medical brother as to the signs which compel him to undertake the delivery. I have already enumerated them—and they are easy to be understood. There is, in general, far more danger of the operation being deferred too long, than of its being performed too soon; since, if it be not performed in time to save the life of the mother, it would be as well not to do it at all. I know that, in uttering this sentiment, I am liable to the imputation of wantonly encouraging the use of this dreadful operation, but I wish to disclaim such an intention. Any one possessed of a mere common humanity would instinctively recoil from the performance of such an office, and no man can have read the eloquent appeals of Alphonse Leroy on this subject without feeling that he was right in advocating the cause of mercy. I hope that no man living is reasonably more reluctant than I am to use any obstetric instrument whatever; and I fear that the resort to its employment is often had very unnecessarily and rashly. But I think that, when the case under consideration arises, we ought to act so promptly and so understandingly, that we may, on the one hand, derive a perfect success from it, and on the other stand acquitted, in our own judgment and in that of others, as well as before God, from the charge of any rashness or precipitation. I shall strive, therefore, while I reiterate the opinion, to clear myself by repeating that all such cases require a medical consultation. To mutilate the child and then lose the mother, is a real misfortune, both for the practitioner himself and for the profession, which, from such results, is in danger of falling into disrepute. Let the Student read the memoir of M. de Broqua (*Mém. sur un Accouchement Laborieux*, Paris, 1824), in order to learn what danger may be incurred by the professional man, who even, assisted by a respectable consultation, terminates a labor by embryulcia. He will find that that gentleman, though evidently guided by the purest lights of science, and by a good and clear conscience, was led into the greatest straits and anxiety by the unfortunate termination of the case. I wish that every Student might be as cautious as M. de Broqua in regard to the consultation, under such trying circumstances.

It is to be understood, then, that where all other instrumental means fail—where, after due reflection upon the circumstances that hinder the delivery, a conclusion is formed that the mother and child must both perish, unless the latter be withdrawn by the assistance of instruments that mutilate it—where the Cæsarean operation is inadmissible, or rejected by the patient, we have the remaining and very sure resource of the operation of embryulcia, or embryotomy; and we can venture to encourage and cheer the unhappy and suffering female with the prospect of speedy relief by its means.

I have had occasion to feel, in common with many other practitioners, how dangerous an instrument is the sharp crotchet. The force to be spent on it, in extraction, is so great that, should the point slip or tear out from the bone, it is always jerked downwards several inches, and is very apt to catch in some of the soft parts of the mother, which it ploughs up and lacerates. How easy it would be to lacerate the vagina, or even the lower part of the womb, by the slipping of the point; and nevertheless, he who uses the crotchet, and is perfectly aware of the risk, is under the necessity of running that risk whenever he takes the instrument in his hand to deliver with it. There is no part of the cranium to which it can be applied without some hazard of its losing its hold. This is more apt to occur, from the faulty manner in which the crotchet is generally made, namely, with an iron and not a steel point. With a point of soft iron there is no real security; because the point soon becomes dull, and does not maintain its hold of the bone. The point ought to consist of well-tempered steel, and should be made as sharp as possible—but very much bevelled, and quite short.

There is a vast variety of instruments prepared for the delivery of the head in cases of deformed pelvis. Dr. Davis, of London, has invented a great number of them, some of which I have had occasion to use, but with less satisfaction than I expected to have, from the strong recommendation bestowed upon them. I am now well convinced that a great apparatus of this sort is not at all necessary, as I think will be conclusively shown in the sequel of this article, in which I shall describe an instrument capable, with the occasional aid of one sharp crotchet and a perforator, of effecting the delivery of the head in the most restricted pelvis from which delivery is at all possible.

As this volume is not designed to be drawn out to a great length, I am constrained to make many of the remarks that I could otherwise find occasion to offer, more brief than is compatible with a copious detail of the subjects. But, notwithstanding this necessity, I am induced to give at length the history of a case of labor in a deformed pelvis that was under my notice in the year 1831. It was drawn up by my friend Dr. George Fox, now surgeon of the Pennsylvania Hospital, and published in the *North American Medical and Surgical Journal*, vol. xii. p. 484. It may, perhaps, serve sufficiently well to set forth the difficulties and embarrassments with which such cases are surrounded, and the success of it, probably the most difficult obstetric operation ever successfully performed in this country, may encourage those who shall hereafter have the misfortune to contend with similar cases, to hope for success in the midst of the greatest obstacles. I consider it more instructive than any merely didactic remarks that I could compress into these pages.

Case of Embryulcia for Deformed Pelvis.—"On Tuesday, June 14, 1831, I was called, about seven A. M., to see Mrs. R———, in labor with her first child: this is stated to have commenced about one A. M. The pains, as are usual in the commencement of labor, very feeble, short, and at about ten minutes' interval. Upon examination per vaginam, the projection of the sacrum was immediately felt. Not, however, suspecting the deformity which was subsequently found to exist, this was not at the time particularly attended to; the os uteri was sufficiently dilated to admit the finger to feel the protruding membrane. I was struck with the form of the sacrum: the rectum being very much distended with feces, I thought it might, in part, be occasioned by this. Directed ol. ricini one ounce, which was taken immediately. At noon found, upon examination per vaginam, that the membranes had ruptured, the head presenting: she was not aware at what time the waters had escaped. In the evening, the rectum being unloaded by the operation of the oil, I made a more minute examination, and was sensible of great deformity of the pelvis, though not to the extent we afterwards ascertained, the pains not being at all active. As it was late, I determined not to ask the assistance of my medical brethren till the following morning; therefore directed an anodyne (which I subsequently ascertained was not taken, from her dislike to laudanum, and fear of its retarding her labor), and left her for the night. Was called up about one o'clock the next morning, her pains being more frequent and stronger; found the os uteri rather more dilated, and the external parts very rigid, preventing an accurate examination of the pelvis. I remained with her some hours; subsequently called upon Dr. James, late Professor of Midwifery, &c., in the University of Pennsylvania, who met me in consultation at half-past eight A. M. In consequence of the rigidity of the soft parts, we found it impossible to make any satisfactory examination; we therefore concluded it best she should be bled, and take an anodyne—that we would meet in the afternoon: she was accordingly placed erect in bed and bled to incipient syncope, which was after losing about fifteen ounces; twenty drops of laudanum were soon after given. In the afternoon Dr. James again saw her: from as accurate an examination as we were capable of making (for the external parts still continued rigid, though somewhat relaxed since the bleeding), we came to the conclusion that there were not at most three inches in the antero-posterior diameter; that laterally there was rather more room, on the left more than on the right; the posterior lip of the os uteri was swollen and succulent, forming a cushion in front and a little below the projection of the sacrum; the head was presenting to the left side—its exact position could not be determined. On account of the unusual interest of the case, Drs. Meigs and Lukens were invited to attend; Dr. James, not feeling quite well, did not meet us that night. The result of the examination of these gentlemen was, that there was not more, if as much, room at the superior strait as we supposed; they coincided with us in the opinion that it was impossible the child should be born alive *per vias naturales:* our next object, therefore, was to ascertain whether or not the child was living; this was rendered certain by the application of the stethoscope; the pulsations of the child's heart were distinctly perceived, whilst the placental souffle was also very evident; the pains continued as they had been most of the day, recurring every four or five minutes. We remained with her some hours, when we ordered her an opiate, and agreed to meet at four A. M. The result of this meeting was, that, as the proper means of proceeding were of such immense importance, further advice should be had, and that we should meet at half-past eight o'clock A. M. Dr. Physick was called on, but was confined to the house by sickness; Dr. Dewees was also called for, but was absent from the city. At half-past eight A. M., Dr. James met us, Dr. Hewson being added to the consultation: it was agreed, as before stated, that it was impossible the female should be delivered of a living child *per vias naturales;* the question then was, whether the child should be sacrificed to save the mother's life, or an attempt made to save both mother and child. It was concluded, as the strength of our patient was good, her pulse only eighty-four and strong, as there were no symptoms of constitutional irritation, no injury would result from a few hours' delay; we therefore separated to meet at twelve M.

"The consultation was held at the appointed hour. By this time, after repeated and the most accurate examinations that the case admitted of, we were unanimous in the opinion that there were not more than two inches in the antero-posterior diameter, most probably only one inch and three-quarters. The different methods of proceeding which have been proposed in similar cases were duly and maturely considered, namely, the division of the symphysis pubis, the Cæsarean operation, and cephalotomy: the first was considered inapplicable to the present case; the Cæsarean operation was thought to be attended with so much risk to the mother as almost to be necessarily fatal, some of the most distinguished surgeons being decidedly opposed to its performance. Dr. Physick, who was called upon in the course of the morning by Dr. Meigs and myself to ask his opinion on the propriety of this operation, was decided and positive in his opposition to it. Under the weight of such authority, the idea of the Cæsarean operation was abandoned. It was therefore concluded, after the most mature deliberation, and upon viewing the case in all its bearings, that the life of an imperfect being (for it was again ascertained that the child was living and apparently vigorous) should be sacrificed to save the life of a wife and daughter, and that the operation should be immediately commenced, by opening the child's head, breaking up the brain, and allowing some hours to elapse before attempting extraction. At my request, with the approbation of our colleagues, Dr. Meigs consented to perform it. Drs. James and Hewson, having professional engagements, were at this time obliged to leave us, to meet again at six o'clock P. M. Preparatory to the operation, the rectum was unloaded by an enema, the urine drawn off by a catheter, and an anodyne administered; her pulse was one hundred and four. The consent of the patient, her husband, and friends, having been obtained, she was placed at the foot of the bed (which had previously been adjusted), the hips being on the edge, so that the perineum was perfectly free, an assistant supporting each leg. Dr. Meigs then took his seat directly opposite; made another examination preparatory to beginning the operation. After having some time carefully examined, he called me, and subsequently Dr. Lukens also, to make another examination, the result of which was that the operation of cephalotomy, if not altogether incompetent to the delivery, would be attended with as much risk to the life of the mother as the Cæsarean operation: it then appeared to us impossible that the cranium should be removed and the base brought through the superior strait, without the most violent exertions and great danger of lacerating the cervix uteri, vagina, &c.; that, taking this view of the case, it was better to call our colleagues again together, at as early an hour as possible, to reconsider the propriety of performing the Cæsarean operation: the child was again ascertained to be alive.

"Accordingly, at five P. M. we again met. Dr. J. Rhea Barton at this time saw our patient. Our first object was to ascertain respecting the life of the child, and upon applying the ear and the stethoscope, no pulsation was perceptible in any part of the uterine region; it was then unanimously agreed (the female not having felt the child for two or three hours) that it was dead: there was now no further hesitation as to the propriety of cephalotomy, which was immediately performed by Dr. Meigs, who employed the utmost assiduity and care in the management of the operation, on whose skill and unwearied attention the success of it is mainly dependent. To him I am also indebted for the following account of the difficulties, &c., which were experienced in the accomplishment of the delivery of the child.

"'The woman being conveniently placed on her back, with the perineum projecting beyond the edge of the bed, and the legs and feet properly supported by an assistant on each side, I took my seat for the purpose of proceeding with the first part of the operation, the perforation of the cranium.

"'A suture crossed the pelvis from front to rear, but its edges were overlapped, and could afford no facilities for the operation. This suture was the right leg of the lambdoidal, as was afterwards ascertained.

"'With Holmes' improved perforator, I endeavored to penetrate the solid bone in the centre of the strait, but, owing to the narrowness of the passage, and the constant interference of the os uteri, the lips of which were nearly in mutual contact antero-posteriorly, I dared not to give to the instrument that rotatory or drill-like motion which was necessary, for without such a movement it was impossible to make any progress, as the head rose upwards and rolled freely in the superior basin whenever any considerable pressure was applied by the perforator, though the womb seemed to be pretty firmly contracted at the same time.

"'Finding this mode of proceeding unsafe for the woman, I begged rmission to leave her a few minutes in order to procure an instruent better adapted to the purpose in hand. Accordingly, Mr. Rorer rnished me with a large trocar, and having guided it with two fingers the proper situation, and kept it securely by retaining the fingers contact with the head, I was able gradually to drill a hole through e bone, the head being pressed from above against the strait by Dr. ukens. Two other perforations were made near to the first one, in e same cautious manner; after which, I again introduced Holmes' issors, and, having opened them, found that I had made an incision about an inch and a half in length. Through this a slender bluntook was introduced into the cavity of the cranium, and the brain ry freely broken up.

"'The poor woman, who was already much exhausted by many ours of labor, now took an anodyne and was left to her repose, in rder that the medullary matter might be gradually pressed out and e cranium allowed to collapse so as to come more in reach of the struments.

"'At ten o'clock P. M., I again met Drs. Fox and Lukens, and the atient being disposed as before upon her back, I introduced a crotchet to the cavity of the cranium, and spent some time in extracting the edullary substance, not much of which seemed to have been expressed during our absence; the head still continued lying upon the uperior strait, except a portion of the hind head, which was pressed own towards the excavation to the left of the promontory, where ere appeared to be the largest space.

"'Having removed a considerable quantity of the cerebral substance, fixed the tooth of the crotchet into the cranium, and guarding it on e outside with a finger, exerted a very great amount of force, which ad not the least effect in drawing it lower down.

"'It soon became evident to me, from several trials of this kind, at no exertion of mere strength could be of any avail to drag away e head, and that, if it was to be delivered at all, it must be pieceeal: but, as the child had been dead only a few hours, and its skull ones were still firmly united to their inner and outer membranes, it ill be readily conceived that the removal of the bones was a most ifficult matter, not only on account of the firmness of their connecons, but also on account of the narrowness of the passages, the great rdness of the skull, and the great danger of wounding the parts by e slipping of the crotchet, which, under the circumstances, could be st applied on the interior of the skull; and from the swollen and cculent state of the lips of the os uteri, whose inner surfaces were now in close contact, and presented to the touch the idea of a long fissure instead of preserving a round or oval form: last and not least, the perineum was so strong and unyielding, that the greatest inconvenience arose from its pressing the fingers against the arch of the pubis with such force, and by long continuance so painfully, that no one could endure for any great length of time to keep up the necessary extension.

" 'Being possessed of one of Dr. Davis's osteotomists, I expected to derive great advantages from its employment in the case, and accordingly introduced it with the view of cutting away portions of the bone; but the constricted state of the parts rendered it impossible to make use of it consistently with a humane regard to the safety of the patient.

" 'Having ascertained, then, by fair experiment, that mere force could do nothing in the delivery, I resolved to pursue the intention of breaking up the head by means of the crotchet; and it was with great fatigue to the woman that I picked out altogether about as much as would equal the size of one of the parietal bones, the portions consisting of fragments of the right parietal and part of the frontal bone.

" 'Finding, towards morning, that the progress of the operation was exceedingly slow, I went out and procured a pair of straight tooth forceps, with which I could take a firm hold of the bone and twist off portions, which, after they were broken away, often took a good while to separate from their adhering membranes.

" 'At four o'clock the woman was so much fatigued that we agreed to give her an anodyne draught, and leave her to recover strength by means of a few hours' rest.

" 'The attempts at extraction had now continued from ten o'clock P. M. until four A. M., and I think the whole of the bone removed would not much exceed in quantity one parietal bone at full term. I believe it was impossible to proceed with greater rapidity, and I often admitted a doubt whether I should be able to deliver her before death should come to her relief.

" 'Throughout the day, on Friday, the attempts at extraction were repeated, in presence of the gentlemen last named, and also of Drs. James and Hewson, who became fully satisfied that no greater progress could at present be made, considering the circumstances of the woman.

" 'Early in the afternoon, symptoms of fever became very manifest; the pulse rising to one hundred and twelve strokes in the minute, with considerable firmness and volume; this state of the circulation being coincident with a distressing eructation, partaking somewhat of the character of singultus, and a great distension of the abdomen, as well as of the womb itself, from gases extricated within them. She complained also of great soreness of the belly, on which account she had it bathed frequently with cold vinegar and water, leaving the surface exposed to the air, which was a great solace to her.

" 'In order to counteract this new state of things, she was bled six ounces, and took a portion of castor oil.

" 'Dr. James, who had witnessed in the morning the difficulty with which the extraction of portions of the cranium was effected, was good enough to supply me with a complete set of Dr. Davis's craniotomy forceps, and returned to the house in the afternoon to our assistance. These instruments were applied, but they were incapable of effecting so much as even the straight tooth forceps. The teeth of the instrument could not be made to penetrate the skull, although most accurately adjusted; and notwithstanding the handles were brought so nearly together, that the style on the one handle went quite to the bottom of the socket in the other, every attempt to extract with them resulted in the slipping of the bone out of the gripe of the instrument; a proof at once of the hardness of the bone, and of the impossibility of bringing it down in its then condition.

" 'Putrefaction now rapidly advanced, as indicated by the odor of the discharges, and my only hope for the escape of the patient rested on the opinion that she might be supported a few hours, until the softening of the tissues should enable me to draw down larger portions of bone by admitting of the pericranium and dura mater being peeled off with a finger-nail, while the bone should be secured, and drawn down with the tooth-forceps or the crotchet.

" 'But such was the unpromising state of affairs that the poor creature resolutely refused to make any further effort to escape, saying she knew that she must die, and would rather die than exert herself any further, and she begged in the most piteous tones that all further attempts to deliver her should be abandoned, yet expressing her thanks for the efforts that had been already made.

" 'She was at times slightly delirious. After explaining to her the increased facility which began to exist from the rapid decomposition of the fœtus now going on, and endeavoring to reassure her with a promise to deliver her in the course of the night, she was again left to rest three or four hours under an anodyne draught. During the whole period that has now been spoken of, the anterior lip of the os uteri was behind the triangular ligament of the pubis, and the posterior one low down beneath the promontory, and strangulated, as it were, or buttoned by the part of the head that now laid on the strait and partly within it; yet so swelled that their inner surfaces continued nearly in contact, except when parted by the introduction of the fingers.

"'The perineum seemed to have acquired no disposition to relax, notwithstanding all the handling to which the parts had been subject; and, excepting that the bones were more easily detached now than before, no greater comfort or facility was enjoyed by the operator than at the commencement.

"'At ten P. M. I again met Drs. Fox and Lukens, and the patient, after much entreaty and argument, resigned herself unwillingly to the further prosecution of our attempts to deliver. The remains of the head was still high up, but some of the broken edges came lower down. I got hold of a piece that descended behind the pubis, and with the tooth forceps pulled it downwards, detaching the membranes as it advanced, and found that it consisted of all the remainder of the right parietal bone. I next got away nearly the whole left parietal, and afterwards with the crotchet removed first the right, and then the left orbitar portion of the os frontis, which was all that remained of that bone. I then got away with the crochet and forceps the right superior maxillary, and afterwards the left superior maxillary bone. I subsequently twisted off the greater part of the broad portion of the os occipitis, and the squamous parts of the temporal bones; so that I had nothing left now but the base of the skull and the lower jaw, which latter I left as a point on which to exert the tractions that were soon to be required.

"'If the estimate made by all the gentlemen, that the strait was not more than two inches in its antero-posterior diameter, should prove correct, I was fearful of meeting some difficulty in bringing the base of the skull, which was two and a half inches, through it; but when I had reduced the head so as to leave nothing more than the base of the skull and the lower jaw, I fixed a blunt hook into the latter, and, with a finger to antagonize it, drew the mass down towards the point of the coccyx, and had the satisfaction to find that it was got quite through the strait. My hand being now introduced into the vagina, I got a firm hold of the neck, and with the exertion of the greatest strength, gradually brought the button-like remainder of the head out at the vulva, while the point of the thorax, of course, was entering the narrow pass. The head was delivered at a quarter after one o'clock, and having succeeded in effecting the most difficult and dangerous part of the operation, we gave her some ergot: then fastening a twisted towel round the neck of the fœtus, I renewed the extractive efforts, which in twenty minutes enabled me to deliver the shoulders, and in twenty minutes more, the hips—the child being completely withdrawn at five minutes before two o'clock, which was forty minutes after the head was delivered.

"'I found that, under the stimulation of the ergot, she was enabled to bear down very strongly, considering her exhausted state; and at all events, the chief object of its exhibition was secured, namely, a firm contraction of the womb, and an effectual separation of the placenta, which came into the os uteri soon after the delivery.

"'Large quantities of gas of the most putrid odor followed the extraction of the child, showing the enlargement of the womb, before spoken of, to have been owing to its extrication by the putrefactive processes going on in the uterine cavity.

"'The cord was shrunk and black, and the placenta, which was likewise black, and so filled with air as to crepitate under the fingers, was so horribly noisome that it was scarce possible to endure the stench during the requisite handling of it. No blood followed the placenta.

"'The body was soft and putrid, being completely emphysematous and crepitating like the placenta. The cuticle was peeled by the pressure and friction.

"'The child was rather above the medium size.

"'After washing the poor creature with a sponge dipped in claret and tepid water, and making her as dry and comfortable as possible, she got an anodyne and was left to rest, being unable to speak above a whisper, and with a pulse feeble, but beating only one hundred and two strokes per minute.

"'The whole difficulty in delivering a child through so contracted a pelvis can scarcely be conceived of by one who has not been engaged in such an operation. The constant and perplexing apprehension of injuring the mother, either with the instruments employed, or with the sharp and ragged edges of the bones which must be withdrawn, and sometimes violently broken off with the sharp tooth of the crotchet, involves the operator in the most painful and unremitted attention and watchfulness, which alone, when long continued under compulsion, is real torture. The confusion also in the parts, arising from the ragged remains of the scalp and the inner and outer membranes of the cranium blending themselves, as it were, with the swollen lips of the os uteri quite in mutual contact, and covering and concealing the bones, is a source of great embarrassment, where those fibrous tissues retain so much firmness and compactness.

"'Doubtless, could we have known that the woman would have been able to bear the fatigues of labor so long, we should have deferred the efforts at extraction for twenty-four hours after the perforation of the head; but such was not the opinion to be gathered from the actual phenomena.

"'It has been seen that no great loss of time took place, after the softening of the tissues rendered it possible to break them up with some facility, whereas the process previously was exceedingly slow and tedious. The perforation was deferred as long as possible, which saved us from the dreadful and cruel operation of cephalotomy in a living fœtus. The child died of long-continued pressure.'

"June 18th (Saturday), nine A. M. Our patient says she feels quite comfortable; had some sleep after we left; pulse one hundred and twelve, rather more feeble; skin moist; tongue slightly furred. Clean linen, &c., was put on her, and she was moved up in bed. The bladder was emptied by the catheter; fomentations with flaxseed mucilage directed to be applied to the vulva; the most perfect rest and quiet strictly enjoined; as diet, arrowroot and oatmeal gruel, tea and toast.

"Evening. Remains much the same; bladder again emptied; mucilages continued; an anodyne to be given at ten P. M., if at all restless.

"19th, nine A. M. Passed a comfortable night; pulse ninety-four; skin pleasant; tongue slightly furred; lochia almost natural; free from pain; slight soreness over pubes to left side; directed warm brandy to be applied over soreness, a Seidlitz powder to be given, and repeated, if necessary; continue other means.

"Evening. Medicine not having operated, an enema of warm flaxseed mucilage was directed, and an anodyne at bedtime.

"20. Rather restless in the early part of the night; enema operated freely; feels very comfortable; no pain; pulse seventy-six; skin pleasant; tongue continues slightly furred; countenance good; spirits cheerful; continue as before.

"23d. Our patient continues to do well, usually rests well at night; free from pain, although the soreness in uterine region continues; secretion of milk copious; feels so comfortable that she has taken an infant to nurse; pulse rather more frequent than natural; tongue clean and moist; bowels costive; passes urine without difficulty—the catheter was used three times daily till last evening, when it was found to be unnecessary; lochia serous; directed ol. ricini one ounce. Mucilages to vulva to be continued, mucilaginous injections per vaginam; continue diet, and perfect rest in horizontal position.

"From this time our patient continued rapidly to improve; in three weeks from the time of her delivery, was so well as to be permitted to go down stairs, and in a short time resumed her ordinary avocations.

"The subject of the preceding case is a native of Ireland, aged about twenty-two years, of small stature, not exceeding four feet and a half; is stated to have been a healthy child till her third year, when she received an injury by a fall, after which she was unable to stand or walk for two or three years; at the expiration of this time she regained her strength, and was subsequently considered an active child. Upon examination, we found the femur and tibia of each extremity very much curved, forming a considerable arch forward; at the lower part of the spine, there was a cavity sufficiently large to admit the hand corresponding with the promontory of the sacrum internally; the bones of each arm partook of the general disease. It was evident she had in early life labored under rickets."

Such is the history of Mrs. R.'s labor by my friend Dr. Fox. It was the most difficult case I have had during a long career. I hope the account above given may serve to instruct the Student better than any mere didactics could do. The case taught me one useful lesson, viz., that the crotchet, or *uncus*, which was for many centuries the woman's instrument, is a detestable thing; and that a better one was wanted. That better one I learned to supply; and in doing so, I have made a valuable contribution to our art.

In all cases where the diameters of the pelvis have been so much diminished by rachitis or mollities ossium as to render the descent of the fœtal head impracticable, it has been the universal custom either to perform gastrotomy, or to lessen the size of the cranium by evacuating its contents, and then extract by means of the sharp crotchet. The method last spoken of is, perhaps, a good one, where the diminution of the pelvic passages is not too considerable: nevertheless, we find, upon reference to the records, that a great many women have been victims in such untoward labors, owing, measurably, to the violence done to the soft parts during the forcible extraction of the head, insufficiently reduced in size to admit of its transmission with safety to the mother—and probably in no less degree to the wounds that have been inflicted by the slipping of the crotchet.

The firm bony structure, composing the base of the fœtal skull, is nearly two inches and a half in its transverse or smallest diameter; mere excerebration, therefore, cannot be regarded as furnishing a good security against fatal contusions from the forcible extraction of such a body from a pelvis whose smallest diameter is not exceeding two inches in length. Such a body as the base of the skull must, in order to pass through such a pelvis, present itself in an inclined attitude, or with a dip; but this dip or inclination can be only imperfectly communicated to it whilst all the bones of the cranium retain their connection with each other. To enable such a base to pass downwards safely, the skull must be taken to pieces, and those pieces removed in succession. In some instances, this successive ablation of the cranial bones has been effected by the crotchet, the point of which was used to pick out the bones, sometimes in portions not larger than the finger nails; as, for example, in Elizabeth Sherwood's labor, impressively narrated by Dr. Osborne. Those who have perused that account will remember the extreme perplexity of that practitioner, and the infinite pains he took in his anxiety to avoid injuring her with the crotchet. He could not get the base of the cranium down until he had removed all the rest of the head.

Having had occasion to observe the difficulties and perplexities arising from labor in deformed pelvis, as they occurred in Mrs. M. R., the case above related, whom I have now delivered in two accouchements, I venture to lay before my professional brethren the impressions I derived from observing and conducting those two labors.

There is reason to believe that no other female has ever been safely delivered in this country, under the disadvantages of a pelvis measuring only two inches from sacrum to pubis, which, by the judgment of persons of the highest claims to confidence, is the extent of Mrs. R.'s case. I speak this, however, under liability to correction. All the gentlemen then consulted, agreed that the diameter was as above mentioned.

Her second accouchement took place in the month of June, 1833, the child having reached the full term of utero-gestation, an event which I greatly deprecated, having vainly urged, with the concurrent advice of Dr. Dewees, the operation for inducing premature delivery.

The experience I had acquired in delivering her in the first labor convinced me that the crotchet was not to be relied upon in her case: not only because of the danger from contusion in extracting the skull, and from wounds made by the point of the crotchet, but also from the loss of time requisite for picking out the head bit by bit. The patient had almost fallen a victim to exhaustion in the first labor.

In reflecting upon the facts that had occurred in 1831, I found that the problem about to be solved in the second labor was not, a head being retained above a pelvis too small to transmit it, to extract said

—but the question was, to extract said head with the smallest
of time, and least possible risk to the mother. I had *already*
tained that the Cæsarean operation would not be submitted to.
supposed that the head might be four inches in its bi-parietal dia-
ır, and I knew that the plane of the pelvis was only two inches.
er such circumstances, the vertex will not present, but the crown
ıe head will be the presenting part: but since the cranium cannot
le farther than is necessary to bring it in close contact with the
erior part of the mother's abdomen, there will be two inches of the
l lying upon the plane of the superior strait, and two other inches
ecting in front of the symphysis pubis; or, in other words, the
rn of the head will repose upon the top of the symphysis pubis—
of the head being behind, and part in front of that bone.

here is a very important principle in the management of such a
, which is, that all that part of the cranium which lies in contact
ı the mother's back, is perpendicular to the opening of the strait,
may, when the skull has been opened, be seized with a straight
eps or pliers, like that represented in the engraving, Fig. 127;

Fig. 126.

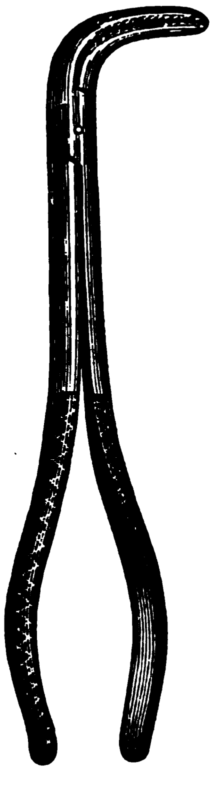


Fig. 127.

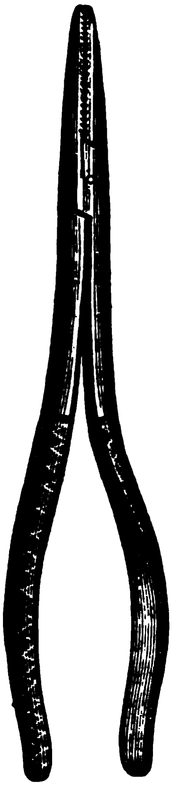
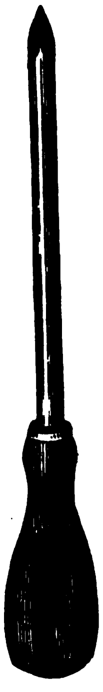


Fig. 128.



whereas, all that part of the skull that lies horizontally over the opening, can be taken hold of with a curved forceps or pliers, Fig. 126. Long before the occurrence of Mrs. R.'s second labor, I caused the proper instruments, Figs. 126, 127, and 128, to be prepared by Mr. John Rorer, the eminent surgeon's instrument maker. Aided by means of this apparatus, I encountered but little difficulty in delivering this patient, whose first accouchement had cost me so much toil and anxiety. The invention is my own. I published it soon after the event spoken of, in the *Baltimore Med. and Surg. Journ.*, and it is now known and used in this country as my embryotomy instruments. Neither Mulder nor any other author has described or proposed it. I look upon it as a most important contribution to the Operation in Midwifery. In a great majority of the cases, it wholly supersedes the crotchet, and mitigates the danger of the embryotomy operation in a remarkable manner. I am glad to believe that it has got into a very general use in this country, and I hope it will in the end entirely supersede the most detestable of instruments, the sharp crotchet.

I may properly be allowed to express the surprise which I experienced in finding my just claim to the invention of this most useful instrument treated without due regard, in quarters from whence the greatest liberality might have been hoped for in acknowledging the authors and inventors of things that contribute to the perfection of our art.

I have found, upon applying the test of practice, that when the thin portions of the cranial structure are taken hold of, either with the straight or curved forceps, they can be broken up with great ease, and removed with sufficient celerity; so much, indeed, that a head may be reduced to a very small remainder in a short time. I believe that if early arrangements are made for delivering the patient by this method, no danger will exist of exhaustion or excessive constitutional irritation being produced before the extraction of the fœtus can be completed.

From the foregoing remarks, it seems to be very clear that the practitioner, in undertaking to deliver a patient with excessive distortion of the pelvis, ought to proceed to his operation with a full understanding that, after perforation, he is to remove all the posterior parts of the presentation with the straight pliers, and all the anterior and lateral ones with the curved pliers; making attempts, from time to time, to draw the head down, as he finds reason to believe that it is sufficiently broken up and collapsed. Such are my views of the mode that ought to be adopted. I, at least, am fully of opinion that Mrs. R. could not have been rescued by me, had I relied only upon the crotchet for her delivery: with my embryotomy forceps, I should not hesitate to promise to deliver speedily in a pelvis of two inches.

It is proper to observe that the female constitution suffers less in the first hours of labor, in which the head cannot engage, than in those wherein the head sinks *low* into the excavation. This depends, in part, upon the well-known principle, that the contractions of the womb are violent and powerful in proportion as that organ becomes smaller or more condensed. If the head becomes arrested in the excavation, and particularly after having wholly escaped from the uterine cavity, it is urged with great power upon the tissues, which resist its further descent. Under such circumstances, constitutional irritation is rapidly developed; whereas, under the more lenient exertions of the uterus, while the entire fœtus is still contained within its cavity, not only is the impulsion of the head against the resisting tissues far more moderate, but during the intervals between the pains the pressure is suspended. Hence a woman remains long in labor with little constitutional disturbance, in the kind of cases I am discussing. These observations are illustrated, and their truth confirmed, by reference to some of the most celebrated examples of such labors which are recorded in the books.

Whenever, therefore, a woman who is known to have an impracticable pelvis, has fallen into labor, and in whom the Cæsarean operation is rejected—if the perforator is to be resorted to, it should be applied as soon as possible, in order that, the child having ceased to exist, all the facilities derivable from the incipient decomposition of the fœtus may be enjoyed. The firmness and cohesion of its soft parts are so much lessened by maceration in an elevated temperature, equal probably to 99°, that the extraction of the pieces of bone becomes comparatively easy. I should, therefore, in such difficult cases, recommend that all attempts to deliver should be delayed, if possible, for many hours after the perforation of the head. This recommendation is founded on what I have experienced of difficulty in getting out the portions of bone after I had broken them up, when I made the attempt antecedently to the occurrence of signs of decomposition. The patient can meanwhile be quieted with anodynes, and supported with light nourishment, and, if needful, may, by venesection and cold drinks, be kept tolerably free from vascular disturbance during the whole period of such delay as may be deemed advisable.

The engraving, Fig. 128, shows the form of the perforator that I employed in Mrs. R.'s case. It is a trocar or drill, ten inches in length from the handle to the point. I recommend it to the attention of the Student as a good instrument for making the perforation in those cases where he can by no means find a fontanel or suture. He ought to notice that, in very great deformity of the pelvis, the lips of the os uteri, which will descend lower than the plane of the superior strait, will be brought so close together as quite to touch each other, and, therefore, he will not be able safely to use the ordinary perforator as a drill—the rotatory motion would wound the mutually touching lips. But such a drill as Fig. 128 is devoid of this objection. I was obliged to make use of such means of penetrating the skull in Mrs. R.'s case, since no suture was discoverable, and the common Smellie's scissors could not be made to perforate the solid bone; any direct pressure causing the head to roll or move upwards, and any rotatory or drill-like motion with it, being impossible without great danger of wounding the lips of the os uteri. The same cut exhibits both the straight and curved pliers. They are eleven inches in length; the gripe is serrated, and the sides of the mandibles are rounded, in order that they may not pinch any tissues except those intended to be included in the bite, which, on account of the serræ, is very sure and strong.

I learned, after the events above described, that this patient again became pregnant; that the child presented the breech, which would make delivery *per vias naturales* absolutely impossible; that she was under the care of Dr. Nancrede, of this city, and was safely delivered of a living child by means of the Cæsarean operation, performed by Professor Gibson, of the University of Pennsylvania, assisted by the late Dr. Beattie, Dr. Nancrede, and others. In a subsequent or fourth pregnancy, I saw her, the history of which case was again drawn up and given to the public, in the *American Journal of the Medical Sciences*, by Dr. George Fox, to whom I am indebted for the relation already above given to my readers, and from whose interesting "*Account of a Case in which the Cæsarean Section, performed by Dr. Gibson, was a second time successful in saving both mother and child*," I here cite a portion of the account, with a view to make it more extensively known by means of this volume.

As Dr. Fox's paper is partly occupied with the preceding histories, I shall commence at p. 17 of his statement:—

"Toward the latter end of August last, Mrs. R. called on me, and stated she had nearly completed the seventh month of pregnancy, and was desirous that I should again attend her: this I agreed to, upon condition that she would consent to the performance of any operation which should be deemed most advisable. Dr. Meigs kindly consented to attend with me.

"Premature labor, in her then advanced state of pregnancy, we considered would be attended with as much difficulty, and much greater danger to the patient, than at the full period.

"Under the impression that the Cæsarean section would be most proper, we endeavored to prepare her system for this operation, should it be concluded upon, by a regulated diet, such as would be least stimulating, attention to her bowels, &c.: accordingly, for some weeks previous to labor, her diet was restricted chiefly to milk and farinaceous articles.

"On Sunday, November 5, 1837, I was sent for by Mrs. R. about five o'clock A. M. On my way to her house, I stopped for Dr. Meigs. We found her laboring under a good deal of mental excitement, with a pulse of 116; countenance anxious and pallid; and apparently in a much more unfavorable situation than in either her first or second accouchement. Her pains had commenced about three hours previous to calling upon us; they were slight, recurring at an interval of about ten minutes; upon an examination per vaginam, the os uteri was found pretty well dilated, swollen, and succulent, as in previous labors; the head presenting to the left side of the pelvis; the membranes had been ruptured. Upon inquiry, we learned that on the evening of the Friday previous there had been a considerable discharge of water from the vagina, which continued throughout the following day; but, as it was unattended with pain, she had not thought it requisite to send for us; this discharge was not produced by any exertion on her part. After remaining with her some time, finding that her pains were not urgent, we concluded to meet at nine o'clock, and invite Professors Gibson and Hodge to join us in consultation.

"9 A. M. Met Drs. Meigs, Gibson and Hodge. We found our patient much the same as when we left her, excepting that the pains were rather more urgent and frequent. Upon an examination of the case in all its bearings, we determined to advise the Cæsarean section, as best under the circumstances. I accordingly stated to the patient our views of her case, and after some little hesitation obtained her consent to the performance of this operation: previous to which, upon an examination of the abdomen, we were struck with the complete anteversion of the uterus; the old cicatrix was dark-colored, hard, and puckered, about five inches in extent; adhesion had apparently united the integuments and uterus for a space of four or five inches, from near the pubis up towards the umbilicus.

"We now ascertained, by applying the ear to the uterine region, that the child was living. Our patient's bowels having been opened by an enema, and her bladder emptied, she was placed upon a table protected by a mattress, on her back, with her hips at the edge, and the operation immediately performed by Dr. Gibson, in the presence of Drs. Meigs, Hodge, Norris, C. Bell Gibson, and myself. Dr. Norris and myself making firm pressure upon the sides of the abdomen to prevent protrusion of the intestines, Dr. Gibson commenced by making his incision with a scalpel, through the integuments, muscles, &c., extending from an inch and a half below the umbilicus, nearly down to the pubis, directly through the old cicatrix: the uterus was found connected with the integuments by strong adhesions, for a space of about four inches; the incision into this organ was made near the fundus, and extended down five or six inches; that portion which was adherent was much attenuated, being scarcely one-fourth of an inch in thickness. To ascertain the extent of these adhesions, Dr. Gibson with his scalpel dissected up the integuments on one side, until a knuckle of intestine protruding satisfied him of their extent, which might be about half an inch.

"When the section of the uterus was completed, the placenta was seen immediately under the line of incision, and partially detached by the separation of the lips of the wound. Dr. Meigs, standing on the left of the patient, now introduced his left hand towards the right side of the womb, displacing the placenta no more than was necessary during the exploration, yet detaching a considerable portion of it, as it filled the wound in the organ; he first extricated the left foot and hand, which were found near each other; the breech soon followed, succeeded immediately by the shoulders, and lastly by the head, after a few moments of resistance, by the contracting edges of the cut, which grasped the neck of the child, and the hand of the operator, with great force. The placenta was soon after removed through the incision, and the cord tied and cut: the hemorrhage from the uterus was at first considerable, but ceased upon the contraction of that organ, after the removal of the child and placenta. The external wound was brought together by six sutures (introduced from within outward), and adhesive strips, and a compress placed over it; a broad band, to support the abdomen, was now applied around it; the pressure of its sides, to prevent protrusion of the intestines, was continued until the external wound was closed.

"The child thus born was a boy of good size, but in an extremely feeble state: some time elapsed before perfect respiration was established, but happily the efforts of Dr. Meigs were completely successful, and all anxiety on its account ceased.

"Our patient bore the operation well, scarcely murmuring; in fact, she says, she suffered but little more than with one labor pain, her pains usually being uncommonly severe. Her position was not altered, excepting that her lower limbs were now supported by another table. The pulse immediately after the operation was 96, just before 112. She is enjoined to lie perfectly still, not on any account to move; to be permitted to take nothing but small portions of barley water; and, in case there is much pain, a teaspoonful of the following: R. Sulph. morphiæ gr. ij; aquæ ℥i. M. ft. sol.

"Soon after the operation, Messrs. J. Forsyth Meigs and Skelton arrived; these gentlemen assiduously devoted themselves to our patient during the first five days and nights, so that, had any unfavorable symptom appeared, we should have had immediate notice.

"1½ P. M. Feels quite comfortable; after-pains very slight; pulse 80.

"4 P. M. Pulse 88; has taken one teaspoonful of morphia solution. 10 P. M. Met Dr. Meigs. Pulse 88; skin pleasant; gentle moisture; tongue clean and moist; some flatulence; not much soreness; after-pains moderate; urine drawn off by the catheter, six ounces; directed solut. morphiæ to be given every three hours if there is much pain, and a small portion of lime-water occasionally for the flatulence.

"6th, 10½ A. M. Met Drs. Meigs, Gibson, and Hodge. Mrs. R. passed a restless, uneasy night; was unable to sleep, though not in pain; took a dose of morphia at 11½ P. M., and another at 5 A. M., also lime-water twice. Her pulse is 85, and soft; skin pleasant; slight distension of abdomen, without any increase of soreness; urine by catheter five ounces, of natural appearance. 1½ P. M. Symptoms all favorable; pulse 88. 4 P. M. Pulse 92. 8½ P. M. Met Dr. Meigs. Pulse 94; skin and tongue moist and pleasant; countenance good; no expression of anxiety; considerable tympanitis; complains much of flatulence; no after-pains; lochia free and natural; urine by catheter ten ounces. At this time, a catheter was introduced into the rectum, which caused the discharge of a large quantity of gas, rendering her much easier, and completely relieving the tympanitis. Directed a tablespoonful of the following mixture to be given every two or three hours: R. Bicarb. potassæ ʒij; sulph. morphiæ gr. ss; aquæ menthæ p. ℥vj. M. ft. sol.

"7th, 10 A. M. Met Drs. Meigs and Gibson. Our patient had a very good night; slept comfortably, without an opiate; pulse 78, and soft; countenance good; respiration natural; skin pleasant; tongue slightly furred, but moist; urine by catheter eight ounces. 4 P. M. Pulse 82; no pain or tenderness; has slept through the day; expresses herself as feeling comfortable. 8½ P. M. Pulse 84; no return of tympanitis since the introduction of the catheter into the rectum last evening; urine by catheter eight ounces; continued mixture.

"8th, 10 A. M. Rested well all night; secretion of milk natural; the infant was put to the breast during the night; pulse 100: skin pleasant, moist; tongue slightly furred, moist; urine by catheter eight ounces; wound was examined without removing dressings; suppuration is commencing; there has been throughout a slight oozing of bloody serum; she is this morning removed to another bed. 2 P. M. Pulse 92; secretion of milk increased so much as to cause some uneasiness to her; breasts are directed to be well. drawn. 8½ P. M. Pulse 92; breasts relieved by drawing; urine by catheter ten ounces.

"9th, 10 A. M. Slept soundly all night; appears very comfortable; pulse 97; skin pleasant, moist; secretion of milk abundant; lochia natural; urine by catheter eight ounces. 6 P. M. Pulse 96; skin moist; abdomen flaccid, free from all pain or tenderness; no flatulence; urine by catheter eight ounces; directed the mixture carb. potassæ to be omitted; she had taken it occasionally, on account of flatulence, since the evening of the 6th; to-night, is permitted to take arrowroot gruel; has been restricted to small portions of barley-water until this time.

"10th, 9 A. M. Slept comfortably; having some return of flatulence, took two doses of potash mixture in the course of the night; relished gruel; external organs were washed with weak wine and water, much to her relief; pulse 104; skin moist; urine by catheter eight ounces. 1 P. M. Pulse 100; wound dressed for the first time; it extends from half an inch above the pubis to one and a half inches from the umbilicus; adhesion has taken place at the upper and lower ends; discharge slight, bloody, dark-colored; at the upper end of the cicatrix from former operation, on the right side of the incision, it is slightly inflamed, of an erysipelatous appearance, and ulcerated, for the space of two inches; I removed a stitch from this point, which seemed to be a source of irritation, also one from the upper end; washed the parts and applied fresh adhesive strips, leaving a sufficient space for the free escape of pus; a piece of lint, spread with cerate, and bandages were then applied; she complained of no pain or fatigue. Bowels not having been moved since the operation, an enema of warm flaxseed mucilage is directed; breasts, which are somewhat troublesome, to be well drawn; the child would nurse, but from the mother's position it is difficult and fatiguing; consequently, we rarely put it to the breast, having from the first had a wet-nurse for it. 6 P. M. Pulse 100; skin pleasant; no pain; all her symptoms are most favorable; urine by catheter ten ounces; enema not having operated, another to be administered.

"11th, 9½ A. M. Slept well, but in consequence of some pain in the evening, caused by the enema (which operated freely), she took two doses of morphia solution; pulse 96; tongue less furred, moist; urine by catheter eight ounces; abundant secretion of milk; no unfavorable symptom; slight dark-colored discharge from wound; fresh cerate applied; asks for increased diet; is to be allowed the soft part of six oysters and a biscuit, in addition to the gruel. 6 P.M. Pulse 96; urine by catheter six ounces.

"12th, 10 A. M. Rested well; took one dose of morphia; pulse 98; skin pleasant; has passed water twice through the night without the catheter; the wound looks well, healing; inflammation about the old cicatrix much diminished; I removed three more stitches, and applied fresh adhesive strips to lower parts of it; diet, milk, eggs, and oysters.

"13th, 10 A. M. Pulse 96; no pain; skin natural; tongue clean; slept well; wound looks well; removed the last suture, and applied fresh dressings.

"15th, 10 A. M. Has slept well for the last two nights; pulse 96, soft and pleasant; skin and tongue natural; countenance good; very cheerful; spirits throughout have been excellent. Wound looks well; adhesion perfect above and below; is filling up rapidly; inflammation of right edge subsided; suppuration moderate, lighter color; lochial discharge has ceased. This morning, for the first time, she complains of her position, which has been altogether upon her back; upon examination, a small slough (size of a cent) is discovered upon the sacrum; inquiry had frequently been made upon this point, but the fear of being moved induced her to conceal the pain and soreness until this time; her position is now being changed to the side, hips being protected by adhesive plaster; a poultice of bread and milk to be applied to slough; diet as before. 5½ P. M. Much more easy since change of position; pulse 92; has for the last two days suckled her infant.

"17th, 10 A. M. Pulse 84; bowels were opened yesterday by an enema; slough separating, superficial, does not complain of it; wound looks healthy; suppuration slight.

"25th. Has been very comfortable since last report; no pain or tenderness; pulse 88; wound nearly closed, a small opening merely remaining about the top of the old cicatrix; the discharge from it very slight; bowels being confined, she is requested to take ol. ricini ℥j; to-day is permitted to sit up in the bed.

"We have conceived it unnecessary to head each daily report, 'Met Drs. Meigs and Gibson,' we having continued to meet regularly during the first week; after which time, Dr. Gibson saw her occasionally, during the progress of the case, as convenience or inclination dictated; Dr. Meigs continued in regular attendance some time longer.

"December 26. Mrs. R. has continued perfectly well; soon after date of last report, was permitted to leave her bed; the slough on the back soon separated, and caused but little inconvenience; the incision in the abdomen has healed, with the exception of a small fistulous opening, which is occasionally touched with lunar caustic; her diet has for some time past been generous.

"February 21, 1838. The fistulous opening heretofore noticed continued a source of annoyánce till the 10th inst., since which time it has been entirely closed; the cicatrix is now complete, and looks healthy.

"*Remarks.*—Our patient had a better 'getting up' than many females after an ordinary accouchement; her sufferings after the operation were slight; indeed, in twenty days from the day of its performance she sat up; and, for some days previous, constantly nursed her infant. The adhesions connecting the uterus and abdominal parietes in front were so extensive, as almost to have permitted the performance of the operation without necessarily opening the peritoneal sac; very much diminishing its dangers. It may be worthy of notice that, nine months subsequent to the former operation, during lactation, the menstrual discharge returned, healthy and natural in every respect. During the progress of the case, the patient was visited by many of our medical friends.

"The infant has grown finely, not having had an hour's sickness since birth."

CHAPTER XVII.

INDUCTION OF PREMATURE LABOR.

In cases of deformed pelvis in which the reduction of the diameters as not gone too far, the child may be rescued, if it be delivered at me period between the attainment of viability and the completion f term, if it shall not have become already too large to pass through e contracted passages.

The fœtus in utero is understood to be viable or *livable* at the comletion of the seventh month; at that period the fœtal characters of he heart have begun to approach towards those in the respiring child, nd the pulmonary vesicles have become so thoroughly developed, that ost of the children born at that term are free from the danger of ontinued atelectasis pulmonum. For a woman with a bad pelvis—rith a pelvis reduced, for instance, to three inches in its diameter—it s very good fortune to be prematurely delivered, provided the gestaion have not gone beyond the eighth month, for the head of the hild at that time is both small and very ductile. The observation of ases in which women with deformed pelves have given premature irth to living children, led at length to the adoption of operations, y means of which the child is ushered into the light, at times suposed to be so happily chosen, that the disproportion between the œtal head and the contracted pelvis should not render its escape imossible.

Dr. Denman, in the tenth section of his twelfth chapter, treats of he propriety of bringing on premature labor, and the advantage to be erived from it. The first information which he obtained upon the ubject was derived from Dr. C. Kelly, who informed him that, about he year 1750, there was a consultation of the most eminent medical nen at that time in London, to consider of the moral rectitude and he advantage to be expected from the practice; which, it appears, net the general approbation. The first case in which it was deemed necessary, was terminated successfully by Dr. Macauley. Dr. Macauley afterwards performed it several times, and sometimes with success;

and Dr. Denman relates the case of a lady of rank whom he attended with Dr. Savage, in consultation, in which the operation proved successful.

Dr. Lee, in his *Clinical Midwifery*, 2d ed. p. 81, relates the history of the operation in the labors of Mrs. Ryan, æt. twenty-one, *primipara*: she lost the child after an embryotomy operation. In her second labor, Dr. Lee opened the membranes at the eighth month: he perforated the head. The third labor was brought on at seven months and a half; the feet presented; child lost. Fourth labor, induced at seven months; footling; child dead. Fifth labor, induced at the seventh month; the child born alive, died in sixteen days in convulsions. Seventh labor, induced at seven months and a half; the feet presented; child lost; great force required. Eighth labor, induced at seven months and a half; feet presented; child dead. Ninth labor, induced at the seventh month; the feet presented; child lost. Tenth labor, membranes perforated at the seventh month; child lost. Eleventh labor, induced at the end of the sixth month; child dead. Twelfth labor, induced in the seventh month; child dead. Thirteenth labor; at the end of the sixth month, labor induced; child lost. Fourteenth labor, seventh month; child extracted alive, but soon died. Fifteenth labor, seventh month; child lost. I have cited this case of extraordinary perseverance, on the part of Dr. Lee, as much to show the resolute energy of that gentleman, as to show what may be expected in many of the cases of induction of premature labor.

It is not to be doubted that the operation is legitimate, and that he who does it properly acts within professional rules and usages; but, inasmuch as every premature labor furnishes some just grounds of apprehension, both for the parent and child, I am clear in the belief that well-understood motives alone can justify the accoucheur who performs it. A woman may lose her child in one labor, and so on throughout a succession of labors, from faults not at all relative to the state of the pelvis. A lady was under my care in this city, who, in sixteen pregnancies, had given birth to only one living child; she subsequently gave birth to two children, of which the first was born a little past the eighth month, whereas the gestation of the last son continued until the close of the ninth month. There was never suspicion of the least fault in the dimensions of the pelvis. A lady of this city, out of eight children, lost seven in labor. It was proposed to her, previous to the birth of her ninth and last child, to submit to the induction of premature labor. I had been long convinced that the cause of the death of the children, in this person, was a cause relative to the action of the uterus and not to the resistance of the pelvis, because ildren, the transverse diameter of whose heads amounted to full ar inches, had been drawn forth with the forceps. I had always aintained that the loss of the children was occasioned by the pre- rnatural energy of the uterine contractions, which, from the begin- ng to the end of the parturient effort, were of a character deserving uly to be called ergotic—the contractions of the uterus being per- anent; and, as the children were large, the placental circulation was ways suspended by the pressure of the after-birth against the child's dy, so that, when born, it was born dead from asphyxia.

The deep interest I took in the misfortunes of the parents, thus eprived of the hope and comfort of offspring, did not prevent me om resisting the proposition to bring on labor prematurely; and I lt prompted, from a desire I had to explain myself to the gentleman, address him a letter, which I publish here, not as an argument gainst the induction in cases suitable for it, but as *a caution* to such might feel tempted, unnecessarily, to resort to this method. I do ot suppose I could make a better array of the motives for delaying e operation than I have here done.

The following is the letter which I addressed to the gentleman, who, eing himself a physician, had assisted at the very large consultation physicians summoned for the purpose of deciding the question as the induction of premature labor in the case.

Thursday, *August* 17, 1843.

Y Dear E.:—

As you appeared yesterday to be at a loss to decide upon the steps roper to be taken in the approaching crisis, and, as I suppose, rather clined in favor of the operation for the induction of premature labor, think I shall feel better satisfied if I lay before you, in writing, the asons which compel me to entertain an opinion perhaps wholly con- ary to your own sentiments and wishes, yet maintained, as I think, r your real interest and happiness. I prefer that you should have is written statement both for your own greater satisfaction and also order that I may not be at all misunderstood. Opinions thus de- berately expressed and defended are safer than those delivered *vivâ ce*.

I am sure that you already know that I approve of the operation r inducing premature labor, in all cases where it is not performed o early to admit of the viability of the child, and where the with- olding of it altogether, involves the *mother* in the certain necessity d risk of a severe embryotomy operation.

If the antero-posterior diameter of the upper strait is below 3½ inches, there is always the greatest probability that embryotomic instruments will be required; I say, the greatest probability; for it is certain that children have been born without their aid in cases of pelvic deformity even greater than this. Such a deformity, then, if it does not go too low, would warrant the operation, and recommend it as an act of professional duty. Now my opinion on this point is, I hope, very clear. But where the pelvis is of such magnitude as to admit of the transit of the fœtal head, and further, renders the application of the forceps practicable, I hold that no man would be justified in inducing premature labor, without exigent necessity arising out of some well-understood, highly probable peril of the mother herself.

In the case in question, we have seen delivery effected in a labor of four hours with a fœtal head of dimensions which may, without exaggeration, be termed enormous; for a head of four and a quarter inches in the bi-parietal diameter is equal to the largest head I have ever seen at birth, and is just nine-twentieths of an inch above the average magnitude.

The history of the past labors shows that the difficulty does not depend upon the smallness of the pelvis, either actual or relative. The history of hundreds of labors issuing happily will show that the fœtus can bear longer and severer pressure of its *cranium* than ever has been borne in our case. In fact, the history of these labors, as I know that history, shows that the evil has been in the uterus, and not in the pelvis. This, perhaps, you may not admit.

Peradventure, a premature labor might be marked by a character of uterine action different from those that have fallen at term: but shall a man feel justified to enter on an important operation, one admitted to be dangerous to the mother and uncertain for the child in the proportion of 50 per cent., upon the ground of a mere peradventure? I cannot think so.

I am not much accustomed in my medical transactions to be guided by what are called authorities. In the first place, every case of disease, and every case of surgical disorder or accident, is a specialty. The action upon each case should be determined by judgment held upon the case, and not upon reported cases. Besides, I conceive myself to be capable, after the clinical experience I have had, of judging for myself; of making up my own opinion of what is my duty in every instance of disease submitted for my opinion. Were I, however, very readily inclined to follow the masters, I know not where I should look to find an authority for this operation. The only one that has the least resemblance of favoring it is that of Denman, who twice induced a premature labor successfully for women who had eviously lost their fruit in utero in the seventh month. The cases, ou see, are not parallel, and, if they were, I should not be moved by em; for I have seen a woman lose four children in successive pregncies, from the sixth (or fifth) to the seventh month, who yet bore ildren afterwards at the full term, and in good health. Dr. Denan's patient might have done likewise, and I think he was not stified even by his good fortune in the dangerous operation he perrmed; I think he acted like a rash and injudicious man, whose ccess is no palliation of his error.

To force or invite the womb to enter into action before term is to o violence to the organ by a voluntary interference with the law of s organism. It is a rule, universally accepted, that we must not do iolence to the womb except upon urgent necessity; I adopt and teach is rule; and I can never feel myself justified in recommending such tion, unless I can have very clear perception of the necessity for it, s relative both to the mother and fœtus. So it is pretended that such xigency exists in relation to your lady.

I believe you have taken too flattering a view of the operation, even s it relates to the child itself.

A child is esteemed to be viable at the end of the seventh month. is, I say, esteemed as viable, yet the facts show that a very large roportion of seven months children fail to live long. Indeed, it is nderstood that fifty per cent. of the whole sum of human progeny is st at the end of the sixth year after birth: how much greater the ercentage in the cases of premature parturition!

If you will examine the results of the operation in Dr. Churchill, ou will observe that he states in all 945 cases of the induction; I uppose that many of the 945 cases are restatements, *i. e.* they are ases stated over and over again; but, admitting that there have been 45 operations in fact, we still find that only 536 children lived. ived, I say, but no man knows how long; and it is not uncharitable o say that, if we knew the whole truth, we should be obliged to ake a very large subtraction from the number of 536. I have not he least belief that near one-half have been saved! and it is admited that many of the operations were unnecessary, and even preposerous.

Dr. Chailly tells us that of the 211 cases collected by Stoltz, though ore than one-half of the children were living, one in fifteen of the omen died. Such a result proclaims the operation to be dangerous. t is true that we cannot here decide as to the difficulties and dangers f these 211 cases, and it may be true that the operation is less danerous for a woman with an ample pelvis than for her who has a deformed one, and that in our own case the danger would be less on account of the known capacity of the organ. Be it so—but the argument is a *felo de se;* for it goes to show that it is not demanded by Mrs. E., but only by the child.

Has the child claims? Yes! but the claims of the mother are paramount. Is it demanded as referable to the gratification of an anxious desire to have a living offspring? That is a holy and righteous desire. God grant it may be satisfied; but the function of the surgeon and accoucheur appertains to the *health* of the patient; the happiness of the patient is the gift of God. The surgeon cannot lift the veil of the future; and if he could, he would, perhaps, be even more reserved than he is now as to the institution of attempts, whose object goes beyond his true vocation. Let him adhere to his vocation, which is fulfilled when he preserves or restores the health of his clients. The mother is his client in the paramount degree.

Let us essay to set in order some of the reasons for waiting until labor shall begin spontaneously in this case.

1. She has given birth to one living child.
2. She has had one unassisted delivery.
3. She has had children of enormous magnitude.
4. There is great reason to suppose, even if it be not absolutely true (as I believe), that the fault is in the nature of the uterine fibre, and not in the form or dimension of the pelvis. If so, then no operation is admissible.
5. She has recovered well.
6. She has been delivered of a child beyond the average size, in a labor of only four hours.
7. No man knows whether the child now in utero is above the average size.
8. If there is a breech, knee, or shoulder presentation, what should we gain by violence done both to the mother by the operation, and to the child by hurrying it into the struggle before it is completely developed and prepared for the strife.
9. Who knows if it be or be not a twin pregnancy? if it be a twin pregnancy, what vain, what poignant regrets over a step signally false!!
10. Possibly, she may spontaneously enter on labor at eight months and a half.
11. Do we know that it has not already a prolapsed cord?
12. Suppose the operation done, and the lady attacked with the chill so common in the case—suppose her the victim of a metritis—with a living orphan child? *cui bono!*

But, my dear E., I will not continue to string together objections; they are all comprised in the single fact that she is a fit subject for a forceps operation, if that *should* be demanded by the circumstances. This fact is an unanswerable one, in my estimation. It is true, I could set forth reasons of a moral complexion for refusing intervention, but I shall refrain considering them, as equally obvious to you and to me. I pray you, however, in this matter, not to misapprehend me; I have no doubt of the morality of the induction; nor of our legal right to do it, under the diploma given by the authority of a State. I look upon that diploma as an authority given to me by State commissioners, and, in the name of the State, constituting me judge, to act at my peril under the indications of an upright and enlightened conscience and judgment. But the spirit of my commission is caveat as to all rashness and irregularity of proceeding.

I hope the effect of this letter may be to lead you to submit with readiness to the voice or will of the consultation, which was not given in favor of the induction. We admit we do not know, and no man can know, what the result will be; but I trust you will believe that, should it be fortunate, I shall greatly rejoice in your mutual happiness; if it should be unhappy again, I shall sympathize in your distress. I shall in any event steadily adhere to this, viz.: that it is better to suffer the ills that Providence sends for our chastisement than, by rash and ignorant measures of precaution against them, make them tenfold more intolerable.

I am, &c.,

* * * * * *

The following notes were furnished to me by my friend, who was present at the birth of this ninth child. The history of the labor and the measurements of the fœtus, as well as its weight, serve, I think, fully to confirm my opinions in opposition to the operation that was proposed in the case.

NINTH ACCOUCHEMENT.

August 29, 1843.—*Eight months and one-quarter* (*or one-third at most*) *of utero-gestation.*

Labor commenced about seven P. M., a short time before reaching home after a long ride. Quarter past seven.—Reached home, and went immediately to bed; pains recurring, at intervals of ten or fifteen minutes, until eight o'clock, when they became more frequent and of shorter duration.

8½ P. M.—Dr. Hodge arrived; found os uteri size of half a dollar.

9 P. M.—Vs. ℥xxv; Dr. Meigs arrived during the operation.

20 minutes past nine.—Gave 40 grs. Dover's powder by enema.

45 minutes past nine.—Gave 35 drops laudanum, by mouth.

50 minutes past nine.—Pains recurring; membranes protruding; os uteri fully dilated.

55 minutes past nine.—Pains on and off; intermitting; uterus relaxes after pain, which is unusual in her case.

10 P. M.—Pains every few minutes.

10 minutes past ten.—Cramps in left leg during pain.

20 minutes past ten.—Anodyne effects decided; patient complains of feeling sleepy; pains continuing regular and natural until

5 minutes before eleven—when a strong pain came on, with bearing-down efforts.

11 P. M.—Good pain; head descending rapidly; membranes ruptured.

5 minutes past eleven.—Child born; no accident or artificial interference; weight seven and one-quarter pounds, dressed.—Male.

Head. { Bi-parietal diameter $3\frac{6}{10}$.
Occipito-frontal $4\frac{6}{10}$.
" -mental $5\frac{4}{10}$.
Bi temporal 3.

In the only case in which I have ever been desirous to bring on a premature evacuation of the womb, I could not obtain the consent of the woman to its performance, yet I have had a good deal to do in consultations relative to the cases of this kind that were under the care of my professional friends and correspondents. In all those instances that have presented of late, I advised a resort to Kiwisch's method, or to that of Braun—and I now feel convinced that Braun's is to be preferred to all others.

Kiwisch's method consists in using a douche of water, directed by means of a proper apparatus against the os and cervix uteri, and I believe it will be always found that, if a strong current of water is daily thrown by a proper douche apparatus into the vagina, the os will dilate and the ovum be expelled. This mode of bringing on premature labor, however certain it may be, and safe in its results, is less expeditious than the new method of colpeurysis. Both of these, however, are much to be preferred to the old method by puncture of the membranes, because in both of them, there is good reason to expect that the waters of the amnios will not be discharged until in an advanced period of the labor, when the neck of the womb, and possibly, he vagina is sufficiently dilated. For a premature child, there is lways considerable risk of dying soon after its birth, or while the nother is in labor, and its risk is greatly increased by a too easy discharge of the waters. As neither Kiwisch's upward douche, nor Braun's colpeurysis are chargeable with such an objection, they should be preferred to the method by puncture.

By the douche method, labor may be brought on in three or four days; by Braun's colpeurysis, it is found that about four hours suffice to dilate the os uteri sufficiently to provoke good labor pains, that end in discharging the fœtus and secundines very much in the same way as they are expelled when premature labor comes on from some constitutional or other cause independent of violence. I now refer the Student back to page 253 for an account of Braun's colpeurysis, with a figure of his colpeurynter, and shall make no further remarks on the subject here, as I have sufficiently explained the use of the implement at the above mentioned page.

CHAPTER XVIII.

INVERSION OF THE WOMB.

INVERSION of the womb is an accident in which the uterus becomes turned inside out. Inversion is incomplete or complete: when it is incomplete, the vault or concave of the fundus has fallen down into the cavity of the body, in that of the neck, or that of the vagina. When inversion is complete, the vault of the fundus has come quite out through the os uteri, followed by the corpus and the cervix. The womb, soon after delivery, is too large to remain wholly inside of the pelvis when it has become completely inverted. Therefore, I say that, when the recent inversion is complete, it comes entirely outside of the genitals. In this case the womb is inside out, as a stocking is that has been turned inside out in drawing it off the foot.

The accident is a rare one. Yet the consequences of it are so terrible, that no accoucheur ought in his practice to lose sight of the possibility of its occurrence, nor fail to guard his patient against it.

When a womb remains relaxed or uncontracted after delivery, no attempt ought to be made to take away the after-birth by pulling at the navel-string. Should the placenta be still adherent to the fundus uteri, tractions exerted on the cord would tend to draw forth the after-birth, which might, perhaps, drag the fundus uteri along with it, and thus turn the organ inside out, or invert it.

A patient who has just been delivered, is sometimes still affected with tenesmus that provokes her to bear down. This is not safe; since, if the vault or fundus of the womb should happen to be relaxed, the straining of the parts above it, might turn the vault inwards into the womb—like the bottom of a junk-bottle—and, when once thus partially inverted, such straining would turn it quite inside out. The Student ought to read Article IV. of M. Leroux's work on Uterine Hemorrhages, to learn how clearly the eminent Dijon accoucheur has expressed sound opinions on this subject, and become aware of the risks to which patients in labor are exposed, when conducted by those who do not fully understand the subject of inversion.

Inversion of the womb is one of the most dangerous accidents that can happen to a lying-in woman; it is always attended with severe pain, and violent hemorrhage; and, if not early remedied, becomes irremediable, since it would be as easy to turn a non-gravid womb inside out as forcibly to restore an inverted one, when many days or hours have elapsed after the occurrence of the accident.

Those who have had the hand in utero in turning, can well appreciate the exceeding laxity of the womb when not affected with the pains; and they can conceive that the mere weight of the after-birth, still attached to the fundus, might, were the woman standing on her feet, cause a commencement of inversion, which could be completed by means of the woman's strong voluntary efforts to bear down her pains. It is not to be doubted that instances of inversion have occurred in which the practitioner deserved no further blame than that of not taking proper precautions against its occurrence, by commanding the patient to preserve the horizontal posture and abstain from all bearing-down efforts. Levret gave very special directions to keep the patient in labor in a horizontal posture; and where a woman is supposed liable to hemorrhage connected with too sudden a delivery, he charges us to rupture the ovum early, so that the expulsion of the child may take place slowly and safely.

Notwithstanding the occurrence might take place spontaneously, and immediately after the birth of the child, yet, in a major part of the examples, it has been produced by improper haste and impatience to get away the after-birth.

I have seen but four persons who had inversio uteri, and they are recovered; one of these persons, Mrs. S., was already the mother of two children when she again became pregnant of the child born in June, 1831. It seems that, having, on both the preceding occasions, suffered severely from the method adopted by the physician in removing the after-birth, and supposing a midwife would deal more gently with her, she engaged an old woman, much accustomed, as it was said, to the care of women in labor, to attend her upon this occasion. The child was born by a very easy labor, but the after-birth not coming away so promptly as was desirable, tractions were made upon the cord, which caused the after-birth to come into the vagina. This gave the patient exquisite pain. The midwife, who could not understand why the woman should suffer so severely, made haste to draw the placenta forth by the cord, which made her cry out so loud that it was said her screams were heard in the street. After the mass had come away, the good woman found it still adhering to something, so that she could not take it up, and put it into a basin. She therefore continued to pull it with great force, not knowing that she held in her hands the after-birth still adhering to the womb, the whole of which was now completely drawn forth and turned inside out. The hemorrhage was enormous, and the patient soon sunk into the extremest weakness and exhaustion. Half an hour elapsed before the midwife thought proper to confess her incompetency to manage the case. I was sent for, after she had acknowledged her ignorance of the method of proceeding, and, when I arrived, the patient was without pulse, algid, suffering the extremest distress, with constant jactitation, and a thirst that was unappeasable. To all appearance the woman was in the agonies of death. I found the globe of the womb hanging down full half way to the knees, and [illegible] invested with the placenta and membranes, except where they had been torn and broken by the attempts of the midwife to pull the entire mass, womb and all, away.

Having endeavored to push the whole womb and placenta back into their natural position, and find[illegible] I could not succeed, I sent for my venerable friend Prof. Jame[illegible]ho speedily arrived. Dr. James now made an attempt to reposi[illegible]e womb, but he also failed. By his advice, I removed the placenta, but could not force the uterus up into the pelvis.

In making the attempt to restore it to its place, I followed the method recommended in the books; that is, I compressed the organ in both hands to reduce its size. At last, I observed that the more I handled it, the firmer and harder it became; in short, that I excited after-pains, just as we excite them by frictions on the hypogastrium after the child's birth. I therefore inferred that the proper way of proceeding would be to let it rest, and as soon as the relaxation of the organ should be complete, as it is in intervals between ordinary after-pains, to endeavor to indent its fundus like the bottom of a bottle, and then carry it upwards. I found, on observing it, that the womb repeatedly expanded or relaxed, and became hardened or contracted again. Taking, therefore, the moment of the completest relaxation, I indented the fundus with one finger, and, as it became more and more concave, I applied each of the fingers in succession, until I found that the progress of the fundus inwards was impeded by the os uteri, which, although completely inverted, yet resisted for some time the attempt at reposition. By perseverance, I finally had the pleasure to overcome the resistance of the os, and the peritoneal surface of the fundus was pushed upwards until at last the womb was completely restored to its natural position, but still containing my hand, which was now up as high as a little above the umbilicus. As no contraction came on immediately, I retained possession of the cavity of the womb, which gently excited by moving my fingers within it, until a contraction egan which I suffered to push my hand out into the vagina. While was withdrawing the right hand, I felt with the other the womb rmly contracted in the lower belly, and enjoyed the satisfaction of mplete success in this distressing case.

I have said nothing of the brandy and volatile alkali that were iven to the woman to keep her from dying. She took a very large antity of those articles, besides laudanum, before I left her, which was obliged to do in order to attend to another patient; and I feel nder great obligations to my friend Dr. George Fox, who came at y request, and took charge of Mrs. S. for the remainder of the time at she continued ill. Her situation when I gave her up to his care as nearly desperate, from anæmia; nevertheless, by the administraon of proper restoratives, and the judicious exhibition of stimulants uring several hours, she rallied, and, in no very long time, recovered good share of health.

From that period she was, for a long time, not quite regular as to e catamenia, which appeared at uncertain periods, and less abundntly than before her dreadful accident.

Since the occurrence of the above-recited events, Mrs. S. has been vice safely delivered of healthy children by my friend Professor ache. It is worthy of remark that the placenta was adherent in these ases also; and Dr. B. was not able to effect the delivery of the afterirth, until he had separated it from the womb by the hand introduced to its cavity.

I cannot refrain from mentioning here the case related by Mr. harles White, of Manchester, in which he succeeded in restoring an verted womb to its natural state by compressing it and then pushing up. In his case, the inversion could not have been complete, since, though he represents the inverted uterus to have been as large as a ild's head, it was never expelled through the external organs, and is impossible that, if fully inverted, it could be retained in the excaation. Mr. W. regards his method as of the very highest importance, d thinks he should never have succeeded but for the compression the womb in the hand.

I am ready to admit that it might happen that a tonic contraction an inverted uterus should come on at once, and last so long as to event, for some time, the employment of the plan that I suggest, t think it probable it would always be practicable to return it, in y case where it had not been inverted more than four or five hours, waiting for the moment of its greatest relaxation,—such a moment ust surely arrive, and then, first indenting the fundus, and afterds pushing it steadily upwards through the os uteri, carry it at last into the abdomen again.

Since the last edition of this work I have had an opportunity to confirm my views of the propriety of waiting for an interval of relaxation, before we attempt to reposit the inverted womb. In the autumn of 1855 I was called on by a gentleman, who seemed much agitated, to hasten to his residence, and carry with me an instrument for the ligation of a uterine polypus. He was sent, he said, by the physician in attendance, who had just delivered the lady of a child, and who found that she had a large polypus requiring instant attention. On hearing this statement, I at once concluded there must be a serious mistake, and that the sup d pus was an inverted womb. Nevertheless, as the medical gentlema had sent for me and my instrument, I concluded to take Goo ible canula, and drove to the rendezvous.

The woman was algid, pulseless, voiceless, and to all appearance moribund. The physician told me that she had a polypus uteri, which he wished me to examine. Aft r touching it with my hand, I informed him that it was not polypus, but inverted uterus. So complete had been his misinterpretation of the case, that he had put a strong ligature on the neck of osed tumor, which was tied as hard as the nurse, who tied the knot, could draw the ligature. As soon as I explained the case, he cut away the ligature, and then asked me to try to return the womb into the abdomen, which I was so fortunate as to do; but I tried first Dr. White's method, above mentioned, and found the same impossibility of succeeding as in Mrs. S.'s case. Indeed, I should have never returned the womb to its proper position, if I had not watched for and seized the favorable moment of relaxation to indent the then flaccid fundus, and so, thrust it upward through the corpus, the os uteri and the vagina, into the belly, after which I withdrew my hand. Many hours elapsed before the pulse at the wrist returned—but I am happy to say that the lady recovered her health in the course of a few weeks.

It has been stated that, when the womb is only half inverted, the woman is liable to greater pain and danger than where it is turned completely inside out, in consequence of the strangulation of the part that is griped by the os and cervix uteri, and it is thought by some persons good practice, in such cases, to make the inversion complete. I am unable to speak of this point from any experimental knowledge that I possess, nor do I know that the probabilities of recovery would be greater with a complete than with an incomplete inversion. Inasmuch as the muscular action of the womb is always found to alternate with periods of relaxation, it would probably be in the power of the accoucheur to succeed in curing this partial inversion, by getting his hand within the cervix, and keeping it there until he should find the womb relaxing. As soon as the relaxation should be considerable, he might thrust the inverted vault back to its place, as was done by both Levret and Leroux, according to the relation of the latter named author. Such an attempt, if cautiously and wisely made, could be productive of no harm. If unsuccessful, the woman must be committed to the chances of a spontaneous reposition.

But, if there be any ground to hope for a spontaneous replacement, as I shall hereafter contend, it seems to me that it would be wiser to let the incomplete inversion alone, trusting it to the power of nature, rather than incur the hazard of wholly inverting it, which would greatly lessen the prospect of a future spontaneous cure.

Of course, I am understood as recommending this confidence, or rather hope in nature, only for those in whom every reasonable attempt to restore by the hand has utterly failed and been quite abandoned.

A careful and attentive practitioner of midwifery will never fail, after the delivery of the placenta, to examine by palpation of the hypogaster, the state of the uterine globe; and there can exist but few individuals in whom such an examination would not disclose the absence of that proper degree of convexity of the fundus uteri, should it exist, which is the sure demonstration of the truth that inversion, either incipient or complete, has taken place. As inversion can only take place by the falling in of the dome of the uterus, such fall is sure to show the upper part of the organ concave instead of convex, upon palpation of the hypogastric region.

I delivered a woman some time since who was moribund with hemorrhage from placenta prævia; when I turned the child and brought it away by the feet, the womb, which was as flaccid as a wet ox-bladder, sank inwards, allowing the placenta to come forward to the os uteri. I took the placenta away, and the dome of the uterus came into the vagina. I pushed it back; it made no resistance; and when I withdrew my hand, it followed it again. The patient expired in a few minutes.

I considered her to be dying when I reached her bedside.

The utter flaccidity of this uterus has convinced me that the cases reported, of spontaneous inversion, may have been really so, and independent of any rash manœuvres; for the weakness of the muscular apparatus may be so complete, that the rest of the component tissues of the womb cannot prevent it from becoming inverted under the slightest efforts of breathing, of tenesmus, or even of change of position.

I met with a case in which the womb had been inverted about two years. The woman had a profuse hemorrhage, and was thought to be in extreme danger at the time of her confinement. She gradually got better, however, but remained subject to frequent attacks of hemorrhage, by which her strength became much reduced. At length a physician whom she called in made an examination, and found the womb inverted. In this case the uterus hung down into the vagina, and was, I think, turned completely inside out; it was not much larger than the healthy non-gravid womb, and did not appear to be very sensible to pressure, but bled ily. By careful regulation of the diet, strict attention to her bowels, and the use of astringent injections, under the care of her physician, Dr. Mœhring, the hemorrhagic tendencies had of late been happily counteracted, and she was acquiring a more decided state of health. She now went freely about the house, and even about the city. This I regard as a very consolatory case, as it furnishes additional ground to hope for the escape of our patients with life, even where the inversion is incurable.

Without considerably altering the above paragraph, I shall now state that, subsequently to my visits and examinations, this patient was seen and examined by Dr. Hodge, Professor of Midwifery in the University of Pennsylvania. Dr. Hodge has assured me that he had no doubt of the diagnosis, which was inversio uteri. Dr. J. Warrington, a practitioner and lecturer on Midwifery, had charge of her afterwards, and made the same diagnosis, of the correctness of which he entertains no doubt. After her health had greatly improved, she manifested symptoms of pregnancy, and proved to be pregnant by miscarrying of a fœtus of near five months. Here, then, was a case of spontaneous replacement of an inverted womb. Of the third case that I met with, the following is the recital:—

May 5, 1841. I this day saw Mrs. S., aged twenty-seven, residing in Marshall Street. This lady is the mother of two children, the youngest of which was born five weeks ago. My friend Dr. Levis, who was in attendance, and who invited me to the consultation, informed me that the infant was born some time before he reached the house, so rapid was the parturient process. He found the lady lying on her back near the edge of the bed—the feet resting upon chairs; as if she had scarcely found time to get upon the bed before the eruption of the child, which a woman was holding in her hands to keep it out of the great pool of blood in which she was bathed. e child's head, she said, was quite born before she got off the pot- mbre.

Upon seeing how great was the hemorrhage, the Doctor pressed his hand upon the hypogastrium, and finding the womb strongly contracted, he removed the placenta, which he found already in the vagina.

After the delivery, she flooded a good deal, and was very weak; but in a fortnight had recovered considerably. After this she was seized with flooding of a severe character, since which time she has not been free from bloody discharges, which are at times quite copious.

Two days ago the doctor examined the patient, and found a tumor projecting from the os uteri, which he suspected to depend on an inversion of the organ.

The woman is very feeble, and frequently has fits of hysterical delirium.

Upon making the taxis, and also upon examining by the speculum, the tumor so closely resembled the appearance presented by the common uterine polypus, that it was difficult, considering its size, resistance, color, and surface, not to believe that it must be a polypus of the womb which had existed throughout the pregnancy, a circumstance hardly possible, however, to believe. In order to test the nature of the tumor in such a way as to have no shadow of doubt, I introduced half the right hand into the vagina, so as to enable me to carry two fingers quite far up into the *cul-de-sac* behind the cervix; having done this I moved the fingers forwards so near to the upper margin of the pubis, that my left hand, laid on the hypogaster, was a very small distance from the fingers of the right. They approached so near to each other as to render me perfectly sure that no womb was interposed betwixt them, and therefore that the tumor below was the womb, and nothing else.

She was informed of the nature of the accident that had befallen her, assured of the utter impossibility of any reposition of the organ, and comforted with the expectation of a gradual diminution of the hemorrhagic tendency, and its final cessation and the recovery of health.

Directions were given as to rest, diet, topicals, &c., and then, after some ten days, she dismissed her medical attendants, to call in homœopathic skill and doses, and, *post hoc, sed non propter hoc*, she gradually got rid of her discharges, as the womb condensed itself more and more, and at last became pretty well again.

This lady, upon recovering in some degree, went on a journey to the Western States, and came back in good health. Some time after her return to Philadelphia, she was found to be pregnant, and was attended in her accouchement by Dr. Levis, who delivered her of a healthy child.

I have received a letter from Dr. Hatch, of Kent, in the State of Connecticut, which I here present to the reader:—

DEAR SIR: I respectfully submit to you the full history of a case, to which, you may recollect, allusion was made while passing a social evening at your house during the session of the American Medical Association at Philadelphia, in May, 1847.

On the 22d of August, 1845, Mrs. H., aged twenty-four years, was delivered of her first child. The labor was easy and natural; the placenta was expelled, without inter rence, about twenty minutes after; the flow was rather copious yet not enough to cause any alarming depression of the system. Fourteen or fifteen hours after, she was seized with pains (said her nurse), of unusual severity for after-pains, which continued with great frequency for from two to three hours, when they suddenly ceased, and Dr. Beardsley, an elderly gentleman of the profession living near, was called in, being myself at the moment out of the village, o, on my arrival shortly after, gave the following account: " ent was very much exhausted, surface cold, pale, and covered wi rofuse clammy sweat; constant tendency to faintness, and with a p , so small and frequent as to render it difficult to count it. I gave diffusible stimulants, and employed, thoroughly, warm stimulating spirituous embrocations to the skin. Slight reaction coming on, I perceived within the vagina a tumor which protruded from the vulva, of a size one-third larger than a goose-egg, having an uneven surface consisting of little eminences at irregular distances from each other, which I judged to be the inverted uterus."

We made an effort to replace the organ. Carrying my hand within the vagina, after inspecting the presenting surface, which I found to be, as I suppose, the womb, the thumb was applied to the fundus, which I was able to carry within the body of the organ at least two inches; when at this point, it met with unconquerable resistance, and produced much uneasiness to our patient. Our efforts at its reduction were suspended, and an opportunity allowed for rest. The fore part of the following day Mrs. H. was comfortable. In the afternoon, she became restless: in part, doubtless, from retained urine. On being raised up, she experienced increased sensation of pressing down, when it was ascertained that the tumor had again, in part, protruded. Being returned to a recumbent posture, the tumor was pressed from its bearing on the urethra, and the bladder was relieved. A messenger was dispatched to New Haven, a distance of fifty miles, who arrived with Professor Beers, of the medical institution of Yale College, about the commencement of the fifth day of the case.

I continue the story by copying from a letter this day received from Dr. Beers, who, in order to make a connected history of the case, transcribes a portion of a letter I addressed to him, which transcript is given in substance above. Prof. Beers writes as follows: "The foregoing relation of this case was communicated by Dr. Hatch in a letter to me, eight months after its occurring, coming down to the time when my own observation commenced, which was on the fifth day from her accouchement. The tumor was found as above described; its size was that of a healthy, well-contracted uterus, a week after delivery; it manifested the elastic, firm feel of that organ—had feeling, but not highly sensitive. The patient bore continued and forcible pressure with little complaint; the abdomen was soft, not full; the uterus could be felt when firmly pressed up above the pubis, and subsided into the vagina when the pressure was removed. There was no doubt of its being a case of complete inversion of the uterus.

"The comfortable state of the patient—her anxiety, with that of her friends, and her fortitude to bear any operation which was deemed prudent—induced the council, with scarcely any expectation of success, to attempt its restoration by mechanical force, carried as far as it should be found could be borne with safety. For this purpose, two instruments were procured with smooth, turned heads, like that of a common walking cane, the larger about two inches in diameter, and the smaller of half that size. The smaller was most used, as it was found better to retain its place on the tumor; the head of the staff was applied to the centre of the tumor, which was the fundus of the uterus; moderate, continued, and at length firm pressure was made in the direction of the axis of the pelvis. The head of the instrument indented perhaps an inch or more into the tumor, and the whole pressed so high that it might be felt above, or even with the pubis. The inverted fundus and body of the uterus were pressed into its more soft and yielding neck, so that it could be felt as it is in parturition, projecting around the more solid part of the tumor, giving flattering hope of ultimate success. This was continued four or five hours. After its removal, and several hours' rest, it was found that no benefit was derived from the operation, the parts having returned to the same state as before the attempt."

I am enabled to add that Dr. St. John, of New Melford, was of the council in attendance upon Mrs. H.; a gentleman whose accuracy in diagnosis commands of his professional brethren about him very high respect, and who authorizes the statements here offered.

I have introduced the accounts of the gentleman who saw this interesting case, that, in the mouth of two or three witnesses, its true nature may be established. I follow with its subsequent history, which may be considered to lend an item of some interest in support of the position you maintain, in a recently published work, regarding the possible spontaneous reposition of the inverted uterus.

The convalescence of Mrs. H. was slow, but in four or five weeks she was able to walk across her room, and gained strength steadily thereafter; was soon able to ride out; but when in an erect position, suffered a sense of dragging weight in the pelvic region, and often spoke of the tumor as not having sensibly diminished in size, and as continuing to occupy a low position. Between nine and ten months had passed in this way, since her misfortune, when I was informed that the tumor had then lately so changed its location, "that she knew not what had become of it." In the month of February, 1847, she had a profuse menstrual flow, the first considerable evacuation of the kind she had experienced since in this state; and in March a second eruption still more abundant occurred, from which she was somewhat reduced. Nothing of the kind recurred, and she passed the following spring and summer seasons in good health. Early in the winter, I think in December last, I was applied to for my opinion as to the question of her pregnancy, and was led to concur with the patient herself in the belief that such was probably her condition. No examination per vaginam was had. On the 23d of May last, at four o'clock P. M., Mrs. H. was attacked with a hard chill, and a spontaneous rupture of the membranes immediately ensued. Slight pains came on and recurred at very short intervals till six o'clock, when she was delivered of a boy, whose weight was nine pounds and six ounces. Very slight pains followed at intervals of from twenty minutes to two hours. There being no considerable hemorrhage, I patiently, but watchfully, waited; while, as a precaution, perhaps unnecessary, I introduced the staff spoken of by Prof. B. by the side of the cord, within the uterus, till it rested gently on the fundus; nor till six o'clock next morning did the placenta descend—when it lodged low in the vagina, and was removed. The patient and her child are now well.

Yours, with high regard,

JOHNSON C. HATCH.

KENT, *Connecticut, July* 1, 1848.

I have already announced, in a note to M. Colombat's *Diseases of Females*, and in my *Letters on Woman and her Diseases and Remedies*, p. 240, the opinion that there are instances of inversio uteri in which, by means of some power, the processes of which are at present not known or understood, the womb reposits itself. The two cases of such occurrence that I related in my "Letters," and the case now given upon the authority of Drs. Hatch, Beardsley, St. John, and Beers, appear to me to be quite sufficient to establish the facts. I am most happy to have the privilege of laying before my medical brethren the above interesting relation by Dr. Hatch, which appears to me to settle forever the disputed question as to the spontaneous deposition of the inverted womb. I am even convinced that my late esteemed correspondent, Dr. Crosse, of Norwich, who appeared to think such an occurrence quite improbable, must have yielded his full assent to the facts so clearly stated by Dr. Hatch. Mr. Crosse, of Norwich in England, in his valuable work, entitled *An Essay, Literary and Practical, on Inversio Uteri*, at p. 177, could not agree with me in the opinion that the first two cases here recited are really cases of spontaneous reposition. "It is easier," says he, "to cast a doubt over the reality of these spontaneous recoveries than to remove the obscurity that pervades the subject generally." Dr. C. also hints that I and my friends may have mistaken a polypus for an inversio uteri: his words (note), p. 177, 2d part, are as follows:—

"*First Case.*—The disease dated from her delivery, two years before, and had existed for that length of time, when Dr. Meigs was consulted. He took the greatest pains to discriminate, and remained under the absolute conviction of its being inversion of the womb; several others concurred in the same opinion. Fruitless attempts were made to reduce the part. Four years afterwards she became pregnant. *Second Case.*—Nearly five weeks elapsed after delivery before the patient was examined and the vaginal tumor investigated by the speculum, and also by the hand introduced into the vagina, till two fingers passed within the cervex uteri and reached the limit of the cul-de-sac, enabling the investigator to convince himself that the tumor within the vagina was 'the inverted womb and nothing else.' After a temporary absence, this patient returned, became pregnant, and gave birth to a child. Hence Dr. Meigs concludes that the inverted womb 'may reposit itself in some rare instances.' (*Colombat de l'Isère*, *Dis. of Women*, translated by C. D. Meigs, pp. 182–4.) The deficient account of the method of diagnosis in the first case is, in some degree, supplied in the second; but there is still an absence of that minute detail of proceedings which, in the present day, is alone calculated to convince the skeptical reader.

It may be asked, if we suppose in either case there was polypus, and not uterine inversion, 'What became of the polypus?' Perhaps it may be answered, that it is more easy for a polypus to be separated and thrown off than for chronic inversion of the uterus to reposit itself spontaneously. Whilst the question remains undecided, and further evidence is needed, we have only to take care that the right rule of practice prevails. Velpeau, one of our best authorities on chronic inversion, remarks: 'Des faits de ce genre ne doivent être considérées que comme d'heureuses exceptions; il n'est pas aucun practicien sensé qui oserait compter sur de pareils résultats.' (*Leçons Orales de Clin. Chir.*, ii. 427.)"

It ought not, perhaps, to expose me to a charge of excessive confidence in my own perceptions and judgment, if I should say that in both the cases referred to by Mr. Crosse, I took the greatest pains to make the discrimination; that I have treated many cases of uterine polypus; and that I have practised as an accoucheur, and been largely engaged in treating the diseases of females, for many years past. Under such circumstances, and supported by the coinciding opinions of Drs. Moehring, Hodge, and Warrington, I aver that no mistake was made. I am now fully confirmed in my belief by Dr. Hatch's case, which seems to me to preclude all cavil as to the question.

Mr. Crosse cites Velpeau's words, that "facts of this kind may be perhaps regarded as the happy exceptions to a general rule; but there is no intelligent practitioner who would dare to rely upon such results;" and Mr. C. adds: "If we subtract all errors, and admit only the well-authenticated cases, it may still be remarked that spontaneous replacement is too rare an occurrence to have any influence upon the correct rule of practice, viz., the effectuating by art the reduction of partial inversion of the womb in all its different degrees."

These remarks are just and sound. Yet as cases do occur in which, from the lateness of the detection of them, or from other causes, the reduction is found to be impossible, it is a most important and consolatory reflection, that there remains the hope of a spontaneous replacement, while we are guarded against the danger of making a discreditable prognosis. There is certainly very little hope for a woman affected with irreducible inversion of the womb, except in this very case of exceptional hope, which I have endeavored to establish, and which, I think, ought not to be gainsaid after the testimony in its favor now given. Moreover, there is very little risk that any person worthy the name of Physician would ever desist from every reasonable attempt at chirurgical reduction, on account of any degree of confidence he might indulge in a possible spontaneous replacement of the inverted womb. So that I am not liable to any charge of advising my reader to desist from all reasonable attempts at repositing the womb, in order that he may indulge the mere hope of a spontaneous repositing of the inverted organ.

I have given a conclusive case from Dr. Hatch, of Connecticut. The Student who will do me the favor to turn to the case at p. 616, will see not only that the woman recovered spontaneously, but that, like the patient of Dr. Moehring, in this city, she afterwards had a child, as also happened to Dr. Levis's patient. Mr. Crosse's doubts as to my correctness affect me the less, since I have acquired (July, 1851) a copy of Daillez's paper on inversion, a paper in which the spontaneous reposition is clearly made out in several instances. Baudelocque, a careful person, admitted it, and the case of Bourcharlatte (Case 84), p. 107, proves it, as in that instance the womb was suddenly reposited after a fall, although it had remained inverted from 1782, when it occurred, until 1790, when, as before said, it was instantaneously reposited, in consequence of a fall. I adhere, therefore, to my opinions, which are, 1st, that we should try to reposit; and 2d, if we cannot, then we may hope for a cure by spontaneous reposition.

CHAPTER XIX.

CHILDBED FEVER.

There is a violent and dangerous disorder, usually known in the world as Childbed fever, to which all lying-in women are liable, which is often fatal, even in the sporadic forms; while the alarm created by the announcement of its outbreak is greatly increased whenever the malady happens to be prevailing as an epidemic. During epidemic prevalence of childbed fever, not only are those women who may have been recently delivered regarded as being in a perilous condition, but even those who are pregnant, and not yet advanced to the last stage of their gestation, are looked upon as persons placed in extremely critical circumstances.

It is not wonderful that such alarm should be excited among pregnant and parturient women and their friends, for it is well known that childbed fever destroys more women than all the other diseases and accidents of parturition put together. A physician cannot long practise Midwifery without discovering that a constant and wise vigilance is necessary to obviate the causes of such attacks, and cure the patient who has been unhappily seized with it. Scarcely any form of dangerous disorder is more insidious in its approach, or more rapid in its development when once its terrific train is set in motion; a development so rapid that the loss of a few hours, at the commencement, renders all after interposition fruitless and unavailing. Not a few of the victims perish within twelve hours, and some even within six hours after the first manifestation of the symptoms. This is one reason why an accoucheur, in full practice, can never feel entirely at ease with respect to women recently confined under his care; and happy for his patients, if his vigilance never sleeps; else there might be prepared for them a rapid and fearful destruction, whose first signal being unperceived, should baffle all his efforts and skill, too late applied.

If these observations are just, then the Student of Medicine ought to consider himself, in all honest conscientious views of duty, bound to give to this subject a careful and even anxious attention; for it is a subject by no means fit to be studied without earnestness, nor cursorily. With it are connected many important principles, that seem of little value as to the matter in general, but which, when considered as relative to the causes, progress, and cure of our disorder, are of the highest importance. There are many good and scientific physiological physicians, who do not apply their general physiology to the elucidation of those mysterious appearances that are discovered in the course of a violent and fatal childbed fever. But the Student ought to be not only a scientific physiologist, but so practically familiar with the laws of life, and its phenomena, as to be able at once to understand and solve the curious riddles that are presented in childbed fever, in its various and complicated, or even in its simple forms.

I have said that there are curious riddles, or mysterious phenomena, in the disease now under consideration; and, I suppose, no one who shall go over the field of inquiry and observe the scandalous discrepancies and inconsistencies of our writers on the subject will cavil with me for saying so. Diseases that are clearly understood, and methods that are proved to be salutary and successful, unite all voices in the proposition as to their nature and cure; but, in our disorder, the utmost latitude seems to have been given to the imagination, so that a complete distraction of the professional mind appears, in the command of this one to regard it as a fever—of that one, as an inflammation—of another, as synocha or typhus; to bleed—not to dare to bleed—to salivate—to rely on opium—on ipecacuanha, on turpentine—on purgative drugs, on saline draughts; and so, of every possible suggestion of treatment, until the Student, confused and baffled in his groping after some sure foundation to rest on, gives up the search for truth in despair, and resolves to wait until the conflict arises, and to do as best he may. Yet all this confusion, disorder, and disagreement exists not in the disease, but only in physicians themselves: the disease is one, the writers and talkers are legion, each one having a thought of his own. Doubtless there is a truth of the matter, and what we want is that very truth; which, if it could be once mastered, would clear our art of this discreditable warfare of opinions upon a subject in medical practice, than which there cannot be one more interesting to us, whether as scholars merely, or as ministers of health unto many confiding friends.

The Student ought to resolve to make himself familiar with all these disputations, to the end that, at last, he should, if possible, come to some fixed and clear views of his own: but, in doing this let him first strip off every prejudice, and present his mind a *rasa tabula* on which to receive the impressions of truth, and nothing else. In studying this subject, let him hear everybody speak, but let him afterwards form his own opinion and establish it on his own knowledge. And I now advise him to question and criticize every statement of mine, whether of argument or fact, and judge as of himself and for himself concerning their truth and value. Should he believe because Gordon believed, or act because Hulme thus acted, he would become Gordon's tool or Hulme's valet and slave. He would not be a scholar indeed, but only a pupil, and a very stupid pupil too; as seeing with his master's eyes, hearing with his master's ears, and aping instead of acting the master, the physician—who, if he be a true philosopher, is, as Hippocrates says, in that like a God. While I thus advise and even implore the Student to render himself master of this important topic, I don't forget that I also have very grave duties to perform as a writer on Medicine. I am not without some feelings of doubt and apprehension, lest, in the weighty matters of this discussion, I should unconsciously add to, rather than lessen the confusion and disorder that I have already complained of. I ought earnestly to wish that I may mislead no young man by persuading him in a false way of pathology or therapeutics as to this fatal childbed fever, nor set forth any opinions, or inculcate any method, which being adopted or pursued after my recommendation, should lead to disastrous results. I strive to liberate myself from the bonds of prejudice, and endeavor to take such a calm and earnest view of the case as may satisfy both my judgment and my conscience, and leave me without any self-reproach for wickedly joining a faction, instead of honestly adhering to the plain truth and the right. This I will endeavor to do; for I know that writers, even those who are as humble as I am, cannot print and make public their thoughts, and then recall or cancel what may be amiss or pernicious; and that a word spoken does not cease to live, but passes onwards and downwards like the generations of mankind, doing its good or its evil work by a traditional force, that appertains to all the words and works of men, whether wise or foolish, good or bad.

Having in a former edition of this work, and in other writings of mine, and particularly in my late work, on *Childbed Fever*, set forth the views with which my mind was early imbued by the precepts and the experience, that fell in my way, and having observed my notions of the nature, signs, and treatment of our disorder to be criticized in many respectable Journals, I might be supposed more willing now than ever to solicit the favorable opinions of that class of the brethren who are occupied as Reviewers. I cannot, however, regard a medical Reviewer as other than a medical Doctor; and since, as I have already stated, I find a really scandalous confusion in Medicine as to childbed fever, I can only look upon a Reviewer as *one* among the Doctors, and one who has no greater claim to shape my opinions on childbed fever than any other doctor of equal attainments. John Fernel, Felix Plater, or good old Monsieur Puzos, or Hippocrates himself, though long since dead, are still members of the ever-living Republic of Medical Letters, and are equal in my eyes to the moderns, as still my brethren and members of my calling. If I cannot change my opinions because those who died 300 or 2400 years ago thought differently, neither can I do so because cotemporary writers take views of the subject different from those to which, after many years of anxious study and reflection, I have arrived. It is but a few years since most of the continental physicians had not the least hesitation to believe that all these childbed fevers are the results of the material substance of milk, displaced from its true normal place in the mammary glands, and deposited, by a metastatic action, upon the womb and other parts that are affected in childbed fever; so that all obstructions, deposits, and swellings were considered to be what the writers denominated *dépôts laiteux*, or milk-deposits, otherwise called *lait repandu*, or milk dispersed throughout the body or the limbs. Vigarous, of Montpellier, an excellent writer, in maintaining, at p. 388, tom. ii., that a metastatic congestion of lymph and milk is the material cause of the disease, convinces himself of the truth of the proposition by *believing* that the purulent and other deposits found within the belly after death cannot be merely the product of the inflammation, because there is no "direct ratio of the product to the inflammation."

Puzos, who viewed the subject in the same light, cannot persuade me that the inflammatory effusions within the peritoneum are caused by metastasis of milk, notwithstanding he, under the falsest views of the pathogeny, was one of the best practitioners that ever exercised his art in the cure of them. He was *par excellence* a bleeder *coup sur coup*, as he calls it. Puzos, who died in 1753, still lives in his admirable writings. But though a teacher in our calling, I feel under no obligation to think and say yes, or no, because Puzos said yes or no. There be many authors, now dead, who command more of my respect and reverence than many that be now living; wherefore, I hold myself not bound by the orders of any one writer, or any school of writers. In the Republic of Letters, the majority cannot govern.

After the foregoing observations, I shall proceed to execute my purpose of showing to the Student my own thoughts as to childbed fever; and I must, in the very beginning, express the regret I feel, to be obliged to use the denomination so commonly adopted for it, for I consider the word childbed fever to be a false and misleading word.

Words are signs of ideas; and many ideas are fashioned upon words, and so, are nothing more than a sign of a sign. When words truly represent ideas, they are faithful servants of the understanding, whose state and will they represent and obey; but when our ideas are fashioned or moulded upon words, those words often make false representations of facts to the understanding; and then, instead of being our faithful servants and ministers, they are traitors to us, and deceivers. Now the term childbed fever is one of these deceiving words; since it infuses into our understanding the false notion that our disease is a fever, whereas in truth it is not pyrexia, or fever, but a pure non-specific phlegmasia. Were it indeed one of the cardinal fevers of Stoll, whether inflammatory, pituitous, or bilious, it would be impossible to take such views of it as we must entertain, provided we regard it as a pure phlegmasia, whose pyrexial manifestations are the loyal and just expression of the degree and stage of the essential phlegmasia, and nothing more and nothing less.

It is therefore unfortunate for science that the word childbed fever was ever introduced, and I should at once proscribe it, if I could suppose myself of sufficient authority to enforce such proscription, which I am far from supposing. All that I can do is, to warn the Student to weigh well the meaning or value of the word, and at least in the beginning, to endeavor to liberate himself from the rising prejudice that the disorder is a fever because it is called childbed fever, for otherwise he will never treat it right.

The disorder here to be treated of is observed only in pregnant and lying-in women; yet it is not one, but many affections. It is inflammation of the womb alone; or it is inflammation of the veins of the womb; or it is inflammation of the peritoneum; or it is metro-phlebitis, or metro-peritonitis; or else a combination of metro-peritonitis with phlebitis. These are its several forms.

In the above enumeration of the several forms of our disorder, I have purposely omitted the cases of ovaritis and other topical lesions, such as inflammations of the Fallopian tubes, for I am convinced that we shall have a sufficiently clear view of the matter if we comprise all the puerperal cases in the single group, composed of metritis, metro-phlebitis, and peritonitis.

For a great many years past, the medical press has teemed with papers containing accounts of the signs left by our disease, and discoverable in the remains of those unhappy women whom it destroyed. It is everywhere conceded that these signs or appearances furnish evidence of a foregone state of inflammation, during the fatal illness of the subject; and even Puzos and Vigarous, as well as their contemporaries, could not but see these signs, notwithstanding they were blinded by the prejudice of the general notion of metastasized milk or other fluids. Many hundreds, nay many thousands of bodies examined after death, have shown the womb covered with inflammatory exudation, and bathed with serum or sero-pus; or reduced to a state of ramollescence by the late inflammation. Similar appearances are seen as to the ovaries and tubes.

Multitudes of the victims disclose, upon dissection, no outward signs of disease of the uterus; but, upon laying it open with the bistoury, the whole uterus or a part of the inner wall is found totally softened and ulcerated, or gangrened. Again—the womb-substance may at the first aspect appear to be perfectly normal in volume, hue, and consistence; but, upon incising its texture, many of its veins and sinuses are observed to be distended with pus, which has been formed by the very vessels within which it is detected by the dissector. In other cases, the above appearances are discovered not only as to the uterus and its veins, but along with them traces of inflammation, with which the peritoneum, in whole or in part, had been affected during the several phases of the disease that caused the extinction of the woman's life.

Some of the subjects clearly show that the patient had suffered under an unmixed, uncomplicated inflammation of the peritoneum, which, though of such violence or extent as to end in death, did not at all involve the womb-substance, nor the veins of the womb.

In contemplating these three cardinal forms of childbed fever, I mean metritis, metro-phlebitis, and peritonitis, I say that the Student ought to conceive of them as having a primary seat either within the uterine veins, in the uterine substance, or on the intra-pelvic peritoneum.

Though the post-mortem traces of peritonitis are sometimes observed to have pervaded every part of that serous membrane, still it is reasonable to believe that the primary or incipient area or areas of the inflammation were directly connected with the womb, as constituting its serous lining, or else with the ovaries, or the tubes, or the round or broad ligaments, or vagina. Indeed, it is very little probable that the primary areas of the phlogosed serous membrane ever exist beyond the pelvis; and, if this opinion is well founded, it is a most important one, since upon it is based the indication that, provided the original area of inflammation is really located within the pelvis, we ought to be not only prompt in our design, but efficient in our duty to limit it within that region, and constrain it at least not to advance beyond those bounds; and in impressing upon it, by means of our remedies, a tendency to recover by *resolution.* I have met with many cases of childbed fever, in their very early and forming stages, and I have always sought for and detected the signs within the pelvic region. When I have unhappily been called so late as to find the peritonitis had extended its area beyond and far above the plane of the superior strait, I have always had the most painful misgivings as to the impending crisis for the sick woman. A woman might well withstand a peritonitis, or even a metro-peritonitis, in which the peritonitic element of it should not migrate beyond the plane of the superior strait, whereas she must inevitably succumb under such an expansion of the area of phlogosis as might comprise within it the whole peritoneum, and, of consequence, all that it invests and can affect by its states of health or disease. No person will be bold enough, however, to deny that so violent an inflammation of the womb as might suffice to decompose and convert its substance into a soft, semi-pultaceous mass, must prove fatal to the patient; and I have seen a uterus that became completely softened by an inflammation of only two days' duration. Tonnelé has given abundant proofs that the cases may be as just stated. Yet it will be found that a majority of the fatal results arise from an extension of the areas of inflammation quite up into the belly, all whose viscera are to become involved in the destruction, inasmuch as their serous covering is a part and parcel of each one of them. It is this extension of the area that is to be chiefly deprecated and opposed by all the means of art.

If, as I above said, the woman must perish whenever the uterus is ruined by the inflammation, how much more surely must she be destroyed, if that inflammation, like a consuming fire, wrap every abdominal viscus in the blaze.

I cannot make an accurate computation of the number of superficial feet contained in the whole peritoneum, including all its duplicatures, but it probably might amount to some sixteen feet, all told. Let the Student imagine sixteen feet of such serous membrane in a state of inflammation, and then ponder for a moment upon the condition of the nervous mass of the woman. Under such distracting provocations, how could he suppose that anything like a steady and regular process of either general or special innervations could be maintained within the animal economy? And how can he doubt that all the organs, with their functions, would speedily fall into inextricable confusion and weakness, seeing that the dominant, conservative, directing powers of the nervous mass are deprived, distracted, baffled, and prevented, by the conflicting impressions and perceptions that attend upon such vast disorders of the tissues?

But what I just now said is not only true, but most important, viz., that the serous coat of an organ is part and parcel with the organ. Hence, when the intestine, stomach, liver, spleen, &c., are, as to their serous portion, inflamed, there is an inflammation of the bowels, a gastritis, a hepatitis, a splenitis, &c., superadded to the metritis or the metro-phlebitis. This cannot be denied; and if not, then where is the ground for that astonishment that is often expressed on contemplating the early sinking state of the woman?

This very tendency to *sink* appears to me one of the strongest arguments that can be brought forward, by those who contend that we have here no typhus or true adynamic disorder to deal with, but only a diffused and deadly inflammation to combat. In typhus, the patient sinks, not because the organs have given way primarily, but because the cause of typhus produces a state of the nervous mass that makes it give way primarily, and the organs secondarily. Typhus depends not on acute meningitis, nor on any inflammatory or catarrhal accident, but it is a primary degeneration or altered crasis of the molecules of the nervous mass, caused by epidemical or contagious poisons. In our sinking childbed phlegmasias, on the contrary, the outburst is with the organs, and so to the subsequent overthrow of the nervous mass; the cases are at opposite poles. The nervous centres are the positive, the organs are the negative poles of the functions or powers of animals. Typhus rules at the positive, phlegmasia at the negative poles. As to any difficulty in accounting for the weakness or sinking in the terrible forms of childbed fever, I cannot conceive of it, after the foregoing statement and contrast. Indeed, the daily observed cases of sinking, or nervous shock that follow dreadful railroad accidents, wherein limbs are torn or crushed, may well convince any man that the nervous mass, at once and directly, succumbs, and fails under such shock; but it might quite as readily be supposed to fail under the perception of those multiplied and innumerable morbid impressions that are produced by many superficial feet of peritonitis affecting the most important organs, that are dying because their peritoneal portion is at the same time dying.

I have perhaps already said as much as is necessary to show my opinions of the nature or pathology of the disorder, as a mere general statement of it. I have not as yet spoken at large of the purulent infection of the blood, or pyæmia, that arises under certain stages of metro-phlebitis, in which myriads of pus corpuscles are evolved from the inflamed endangium. I leave these last matters to be treated of in a future page, and now proceed to speak of the causes of childbed fever, reserving to myself the privilege of entering into fuller explanations of the pathogenic process and pathological states of our disorder.

A woman advanced towards the full period of utero-gestation, or one who has recently passed through the conflict of labor, ought to be considered, *ipso facto*, as in a state of precarious health, and peculiarly liable to be attacked with inflammation. The tissues most likely to suffer such attacks are those that have been directly concerned in the acts of gestation and parturition. In the course of a labor, there is always to be supposed such an amount of distension, pressure, distortion of parts, and check of the circulation and innervation, as to leave no room for surprise that inflammation ensues. Indeed, we have more occasion to be surprised at the failure than at the occurrence of phlegmasiæ as sequelæ of parturition.

In addition to these circumstances it ought not to be overlooked that the uterus, and the whole reproductive apparatus, indeed, are undergoing a rapid transition-stage—one in which they are to seek a state of organic rest or repose, which is only to be attained when they shall all have recovered their normal condition, as it exists in the non-gravid state of the woman. This very transition-state of the organs is one prompt to morbid deviation in its course, and inciting to attacks of phlegmasia.

Again: the blood of the woman during pregnancy, and in the lying-in is, for most individuals, highly charged with the fibrinous element: a state of the blood that is supposed to give a proneness to inflammatory seizure.

There is, also, in women recently confined, a marked diminution of the pressure which previously had acted upon all the parts contained within the abdomen. Such diminution of organic pressure acts in a way, somewhat like the lessening of atmospheric pressure upon a part, as in cupping, to allow the unsupported vessels to become over full. If a new-delivered woman should have the abdomen left without due support from the tonicity or muscular activity of the abdominal muscles, fasciæ, and skin, the circulation within could not but become more abundant; since the vessels of the mesentery and peritoneum must be fuller in relaxed than in well-condensed states of the abdominal integuments. Hence I say that relaxation of them, after labor, incites to inflammatory congestion.

Besides the above-mentioned incitements and provocations to inflammation, there often happen contusions, wounds, and abrasions, greater or less, of parts concerned in the labor; and inasmuch as many orifices of vessels connected with the venous system of the uterus remain patulous long after the discharge of the secundines; and, further, as these orifices are bathed with corrupt and even putrid juices, collected within the womb, we are rather surprised to find the woman recover without accident, than to see her fall a victim to inflammation of the parts.

The placental disk of the womb, or that part of it which, during the pregnancy, was occupied by the after-birth, is left, by its separation in a quasi-traumatic state; so that, instead of readily recovering or healing, it may as readily, under peculiar circumstances, pass into a dangerous state of inflammation.

While enumerating the above circumstances as likely to incite to the attack, I am not forgetful of other so-called causes of childbed fever, nor among them, the Epidemic cause. There is scarcely any disorder that is more frequently observed to become epidemical than this: and it is a singular thing that it may become so for a single house, used as a lying-in hospital. Or, it may become epidemic in a town only, or in a certain district, a state or nation, or a continent. If this be true, then there is to be sought for, and, if possible, discovered, some cause that can either exist as to a single house or even ward of a lying-in hospital, or as to a town, city, or whole country.

The medical writers who have furnished to the profession learned disquisitions on epidemic causation, have signally failed to point out to us what that cause is. And we are to this day as much in the dark on the subject as were the ancients at the date of Hippocrates' treatises on epidemical disorders.

Dr. Sydenham candidly acknowledges our ignorance of the material essence or epidemic cause of such diseases. And while he teaches us that there are what he signalizes as epidemic constitutions of the air, he by no means presumes to show further than the fact that one epidemic constitution is accompanied with a general prevalence of sthenic disorders, while another one is marked by its train of adynamic affections; and, further that epidemic causes act to produce frequent attacks of one set of anatomic tissues, to the exclusion of other sets. Wholly unable to find, in the meteorological states of the air, a clear rationale of these influences, he fell back upon the only remaining resource of the judgment, and showed how probable it is that telluric poisons, coming up from below the geological strata, may render the air unwholesome and inquinate.

My own opinion has long been, that many true epidemial diseases do depend upon causes that are produced beneath the earth's rocky crust; and that volatile and perhaps imponderable essences in which they consist, may forever escape the extortions of the chemist, or the observations of the eudiometrist. The atmospheric ocean, at the bottom of which we live, to use the figure of Humboldt, cannot but have perpetual relations with the earth's more central and igneous mass. There may then be, and there are probably, many material essences or compounds, whose names are not yet, and perhaps never shall be placed upon the catalogue of simple substances. Such elements might inquinate the whole air of a place or a nation for months in succession, modifying the life-force of man in epidemic fevers, inflammation, &c., or they might even be supposed to rise like the material cause of cholera, in certain parallels and meridians, and even to make the circuit of the earth; as cholera has twice done, and as influenza has several times been known to do.

I believe it is correct to say that the meteorological documents have hitherto cast no real light upon the nature of epidemic causes; for those prevalent and wide-spread diseases that depend upon meteorological states are rather to be regarded as weatherly or climatic, than as true epidemial disorders. Hence, it appears to me that the word epidemic-disease, and the word epidemic-constitution, are declaratory and not explanatory words, and mean, indeed, little more than this, namely, that a disease is unusually prevalent, and that such unusual prevalence has some relation to a state of the atmosphere, of the precise nature of which all men are equally ignorant.

Now, although the Student may be unable to learn what it is that poisons the air, and makes us sick, he needs not to deny that the air is vitiated; for he cannot refuse to admit that the cause really exists, and that it must exist in the atmosphere, and not in the earth, or only in vegetable or animal substances upon the earth; inasmuch as if they were confined within the bowels of the earth, or unextricated from vegetable substances, or combined in the waters, they would prove innocuous. He can no more escape from the conviction of its existence than he can escape from the conviction that there is time, space, or force; of which, however, he can no more know what they are, than what epidemic-cause is. Inasmuch as he can reason upon time, space, and force, and make accurate computations of them though he knows them not; so can he, in like manner, reason upon epidemic-cause, and compute its date, duration, and violence, by its effects and results.

For example, let one inquire what it is within the animal economy that can be acted upon by such epidemic-causes. In the Hôtel-Dieu, at Paris, there have prevailed the most devastating epidemics of childbed fever, which, after disappearing for years, have recommenced their ravages in the same establishment, again and again. The same is true of the Maison d'Accouchements or Maternity Hospital, of the Dublin Lying-in Hospital, of hospitals at Vienna, London, Berlin, Prague, Philadelphia, and, indeed, wherever there may have been established any large houses for the accommodation of numerous lying-in women. Such epidemic-cause has been in activity since the age of Hippocrates, twenty-three centuries ago. I made out from that elegant work of Dr. Meissner, *Die Frauenzimmerkrankheiten*, and from Ozanam's *Histoire Médicale Générale et Particulière des Maladies Epidémiques, Contagieuses, et Epizootiques*, a catalogue of dates and places in which epidemic childbed fever has prevailed from 1652 to 1845, with references to the authors who have mentioned or described them. I could easily have augmented this catalogue by additions from Churchill's account in the vol. of *Essays on Puerperal Fever*, republished by the Sydenham Society, were it not inconsistent with the objects and limits of this volume to do so. I shall, therefore, subjoin only the data found in Meissner and Ozanam, notifying that the authorities from Meissner are indicated by the letter M., and in Ozanam by the letter O.

TABLE OF YEARS AND PLACES OF EPIDEMIC CHILDBED FEVER, WITH NAMES OF AUTHORITIES.

A. D.			
1652.	Leipsic,	Welsch,	O.
1672.	Copenhagen,	Th. Bartholin,	O.
1723.	Frankfort and Leipsic,	F. Hoffmann,	O.
1746.	Paris,	De Jussieu and Col de Villars,	O.
1746.	London,	Moore, J. Clarke,	M.
1764.	Dublin,	J. Clarke,	M.
1765.	London and Derbyshire,	Moore, Butler,	M.
1767.	Normandy,	Lepecq de la Cloture,	O.
1769.	London,	Leake,	O.
1770.	Vienna,	Fauken,	O.
1774.	Paris,	Doulcet,	O.
1774.	Dublin,	Collins,	M.
1774.	London,	Moore,	M.
1776.	Vienna,	Stoll and Finke,	O.
1786.	Lombardy,	Cerri,	O.
1787.	Dublin,	Collins,	M.
1787.	London,	J. Clarke,	M.
1788.	Dublin,	Collins,	M.
1792.	Copenhagen,	Rink,	M.
1805.	Dublin,	Collins,	M.
1809.	Leeds,	Hey,	M.
1810.	Dublin,	Collins,	M.
1811.	Heidelberg,	Nægèle,	M.
1811.	Dublin,	Collins,	M.

A. D.			
1811.	Somersetshire,	Bradley,	M.
1812.	Dublin,	Collins,	M.
1813.	Durham and Northumberland,	Armstrong,	M.
1814.	Northumberland, Penn.,	S. Jackson,	M.
1815.	Munich,	F. Boyle,	M.
1818.	Wurtzburg,	Schloss,	M.
1818.	Northumberland, Penn.,	S. Jackson,	M.
1818.	Vienna, Dresden, Bamberg,	Kiwisch,	M.
1818.	Dublin,	Collins,	M.
1819.	Berlin,	Pfeuffer,	M.
1819.	Dublin,	Collins,	M.
1820.	Dublin,	Collins,	M.
1821.	Edinburgh,	Campbell and Mackintosh,	M.
1823.	Dublin,	Collins,	M.
1823.	Vienna,	Lippich,	M.
1825.	Hanover,	Dommes,	M.
1826.	Dublin,	Collins,	M.
1826.	Berlin,	Neumann,	M.
1827.	Barmen and Neuenhaus,	Sonderland,	M.
1828.	Dublin,	Collins,	M.
1829.	Paris, Dublin,	Tonnellé, Collins,	M.
1830.	Giessen,	Ritgen,	M.
1833.	Prague,	Quadrat,	M.
1834.	Paris,	Bouchut,	M.
1836 to 1843.	Vienna,	Klein,	M.
1838.	Stockholm, Paris,	Elliott, Voillemer,	M.
1839.	Wangen,	Zeugerle,	M.
1843.	Paris,	Bidault and Arnaut,	M.
1845.	Dublin,	McClintock,	M.

The foregoing catalogue might with ease be greatly amplified, were time and space allowed me here; but, even as it is, it may serve to show the Student that the *cause*, for there is a cause, may be in activity in many different and distant quarters, and in many consecutive years. At least, the inspection of the table ought to convince him that childbed fever is no rarely occurring disorder, therefore, is well worthy of his earnest contemplation.

The most singular known property of the cause of childbed fever is that it operates upon woman pregnant or lying-in, and upon them only; and that, while its reign causes terror and desolation among that class of persons, it never in the least degree influences the health or threatens the security of the virgin, the child, the youth, the man, or the married but non-pregnant woman. One may well feel amazed at such a proposition, seeing that pregnant and lying-in women, as to their generical nature, susceptibility, and forces, are like all other women, and in a general sense participate in man's nature. How interesting then the inquiry as to what it is within the animal economy of the gravid woman, that can be acted upon by the epidemic-cause to pervert and develop the phenomena of the childbed fever only in that class of persons. And here, it seems to me, he may begin to perceive some ground to stand upon. What is it, then, within the animal economy of the pregnant or lying-in woman, that can be acted upon deleteriously by the poisoning force of the epidemic-cause, whereas all other members of the human race are not obnoxious to the power of that cause?

For my own part, I confess that when I contemplate the living being man, I am compelled to attribute to his nervous element, or nervous substance or mass, all his impressionable quality, as well as all his perceptive and motor force—not motion; for I can not but consider that he lives by his nervous mass, and through it alone; and that whatever, within him, participates in the condition of vitality, does so because, and solely because it participates in the nervous substance, nervous element or mass; and that nothing within him lives, save because of its nervous element. If the blood-disk lives, if the maculæ germinativæ are alive, if an ovarian ovule lives, if the nucleus of a cell is endowed with plastic and alterative forces, it is, in all these cases, because the disk, the maculæ or the nucleus are endowed with nervous mass, in the condition of what Oken calls point-substance. And now, having made this averment, it seems unnecessary to say that I consider the derm, muscle, mucous and serous tissue, the vascular, absorbent, and indeed all the tissues, whether of a general or a special anatomy, to be endowed with life-force, only in virtue of the nervous mass within them, without whose presence and combination in them no vital power or organization could possibly exist in them.

This is the ground upon which, I say, the Student can stand, and on which he shall be sure at last to find a firm and solid footing.

Seeing that neither meteorology, nor eudiometry, nor any power in chemistry, can ever furnish him with a rationale of epidemic-causation, let him, for the sake of argument, admit that the atmosphere may be rendered unwholesome or inquinate by telluric poisons mixed with its lower strata; then it is easy to conceive that these poisons, like opium and the narcotics; like arsenic and mercury; like diffusible stimulants, as ether, chloroform, and other such, may imperceptibly modify the crasis and healthy force of the nervous mass, to that degree as to extend the ravages of the Black death, of English sweat, Syrian plague, or Asiatic cholera, or Influenza, among thousands or millions of our race; or prevail, as epizootic causes, over flocks and herds, and the beasts of the field, or fishes in rivers and in the ocean. It is easy also for the mind to discover that such an epidemic-cause, though it bring within its range men and boys, unmarried women and children, as well as pregnant and lying-in women, shall not be able to effect such considerable morbid changes in the nervous mass as to make any of these classes become victims to it, save pregnant and lying-in women alone; and these, only because their peculiar condition serves, as exciting cause, to bring out into full manifestation the power of the true proximate or epidemic-cause. Epidemic-causes or poisons, such as this, must necessarily be esteemed to be very weak as to their influence on human health; else, we should certainly observe changes in the health of other persons besides the pregnant and lying-in. Still, even such feeble poisons may be able to impress on the body a tendency to become diseased—and such tendencies once established, it is necessary to look no farther than to pregnancy and labor for the exciting and operative causes of the malady. A curious remark is to be found in Dr. Collins, p. 386, which shows that the modifications of the air that precede the eruption of epidemic childbed fever in hospitals are gradual. "Dr. Joseph Clarke states it was generally observed that, previous to puerperal fever becoming epidemic in the hospital, the patients recovered more slowly; or, to use the language of the nurses, it was much more difficult to get them out of bed than usual. This, from experience, I have no doubt is the case; and, when observed, should arouse the medical attendant to adopt, without delay, every means he considers in the least calculated to prevent its occurrence."

I am quite sure that all those practitioners who have lived during the prevalence of the epidemic, even without meeting with the cases in their own practice, must have made the same observation as to the slowness and difficulty of recovery in the majority of lying-in women during the reign of an epidemic childbed fever; and hence we may rightly infer that the *cause* has acted on these very persons that Dr. Clarke describes, and the like of which have been seen by almost all obstetricians, but so feebly, as only to render them unfit to "get out of bed" as soon after the confinement as is to be usually expected. For my part, I cannot doubt that, during the reign of epidemic cholera in Philadelphia, when we lost some seven hundred citizens out of 420,000 souls, there were more than 100,000 persons suffering more or less from the operation of the cause; whereas, in fact, not many thousands of them felt or perceived anything positively amiss in regard to their health. Those only in whom some occasional cause came to start the train of morbid symptoms, could give evidence of the power of the proximate *causation*.

In like manner, I conceive that, in a fatal epidemic childbed fever in Hôtel Dieu or Dublin Hospital, the cause could not but embrace within its epidemic-sphere all the nurses and attendants in the house; but, wanting the occasional causes, none sicken save the pregnant and lying-in inmates of the houses, the districts, or states, comprised in the catalogue. I conceive that these remarks are just, and that they show how it may happen that an epidemical constitution of the air may incline many women in childbed to fall sick with peritonitis, or metritis, or phlebitis, although the *cause* is of such feeble power as to be wholly incapable of making any persons except these very women fall sick.

Many medical men, and along with them a major part of the unthinking, unreasoning public, looking in vain for rationales of the cause of childbed fever, endeavor to satisfy their hankering after knowledge on that point, by adopting the notion that the cause of *epidemic* childbed fever is a contagion.

The Student will naturally be desirous to learn, if childbed fever be really a contagious disease, what the principle of that contagion is; and I apprehend that here, as in the instance of the epidemic malady, he shall have to rest content with the *sound* of the word contagion, a word which, being interpreted, means communicable from person to person, or by individual to individual. This is the whole meaning of the word; for, as to how, and the what, no man hath yet obtained the least definite notion, since no man hath known or can know what a miasm or a contagion is. Miasm and contagion are words, nothing more; they represent no precise material idea of the mind.

The notion of a contagion of childbed fever, communicated from individual to individual, either immediately or mediately through a third person, has arisen upon the observation of what are asserted to be facts. It has often happened, for example, that a woman in a lying-in ward, dying with the disease, has been speedily followed to the grave by other women occupying the same apartment; and it has at once been assumed that the second and third victims had taken the contagion from the first victim, and that, without inquiring how it happened that the first patient acquired the disorder, or whether it was probable that the others might take it in the same way. Again, a physician is observed to meet with many cases in his own practice, while his brethren in the same town or district meet with none such at all: or, a monthly nurse, going from one sick woman to another woman who speedily falls sick with a like disorder, gives rise to an impression that she or that the physician should be looked to as the conveyers of the poison or contagion. Such occurrences are not rare in the history of medical men and nurses; so that a physician or a nurse, in this predicament, has been called a walking pestilence.

There is a striking example of this tendency, of what I cannot but consider weak minded people to jump at conclusions without looking to see where they leap, in the celebrated case of the Manchester Epidemic, the history of which is given by Dr. Roberton. In regard to that epidemic, I do suppose, that at least half of the people who have heard of it, believe that the outbreak of the childbed fever there consisted in the thirty cases that happened to fall out in the practice of that unfortunate midwife that Dr. Roberton tells us of—and if it were true, that these were the only cases, one might be tempted to suspect that a contagious fever had something to do with the matter. Almost all the contagionists who seize on this epidemic as the positive proof of their correctness, have ignored the more important facts, that the disease prevailed in all classes, without exception of rank or station, and that hundreds died with it, and that even Dr. Roberton himself declares, that in many of them there could be no ground to suppose that a contagion had anything to do with the victims.

Deeply impressed as I am with the importance of this question, and quite aware that argument and proof are often alike incompetent to change the stubborn fixed opinions of men, I cannot, however, refrain from setting forth the reasons that compel me to dissent from the doctrine of contagion in childbed fever. I shall, therefore, speak my real opinions, notwithstanding I know they will be combated, and in many instances promptly rejected, and even with disdain. I feel the question to be a most important one, inasmuch as, if we are to accept the notion of a contagious origin, we ought also to meet the consequences of that dogma. Certainly, that man must be an unfeeling and wicked wretch, who, believing in the contagion of childbed fever, should yet continue to exercise his ministry at the risk of carrying death and desolation into whatever family he should be called on to act the part of the obstetrician. For, if one case is communicable, another must also be communicable; and such a believer is bound in honor and honesty to desist from, or suspend his ministry elsewhere, as soon as he happens to be called to any case. Let him not change his dress, and purify his person, and then go like a poisoner, carrying with him wherever he goes, a peripatetic doom. Nobody has told him it is his dress that poisons—the malady is contagious from person to person, and not from dress to dress. Let him stop then at once, nor visit another patient until a long and perfect quarantine shall have made him no longer dangerous as the upas. If he should have another case, let him stop again in time. Certain writers do make a distinction betwixt sporadic cases as non-contagious, and epidemic cases as highly contagious. But, who is he can discriminate in a sporadic case that destroys, and an epidemic one that destroys in an exactly like manner? Whether the woman perish with sporadic or with epidemic childbed fever, the signs, seats, lesions, and results are precisely the same as to the victims, and the power of generating contagion must be ever an identical power. It is useless to cavil with me on the facts. Nothing is more false than what are called facts, since nothing is so difficult as to know what a fact is. The lawyers know this, and even their cross-examinations leave them in so great an ignorance, that the jury vote is always a matter of doubt—and even when given, often wrongfully given. I have carefully read the cases, considered the arguments, and witnessed many of the events upon which so confident a belief of the contagion is founded—and I aver that I do not discover in them any force, that ought to convince me of the contagious nature of the disorder; wherefore I utterly reject and deny the doctrine as one injurious to the profession of medicine, pernicious to the people, by filling the minds of interested parties with alarm, and as propagating, from age to age, a vile demoralizing superstition as to the nature and causes of many diseases.

Should the Student ask me how to explain the curious occurrence of cases in the practice of one medical gentleman, while his neighbor meets with no such cases, I cannot account for so great a mystery; one which evinces rather a strange coincidence of accidents, than a peripatetic causation by the doctor. I prefer to attribute them to accident, or Providence, of which I can form a conception, rather than to a contagion of which I cannot form any clear idea, at least as to this particular malady. To show how such things do happen, I will here relate an incident, which at the time of the occurrence made a powerful impression upon my mind.

A medical gentleman of my acquaintance left a patient whom he had just delivered, and immediately crossed the street, where in a house opposite he delivered another woman very speedily. The lady first mentioned was seized with epidemic childbed fever, and died; the second one got well without the least accident. He was then in the height of an epidemic, which seemed to single him out from among all his brethren as alone doomed to meet with these dreadful cases, of which they had none in their practice. The question may be asked, how happened it that, if he conveyed the poison, he did not convey it to both these women? It is true the Student may reply he was poisonous, but only one of the women was susceptible; and the proof that he was poisonous is contained in the fact that he lost sixteen women, whereas other men lost not one. If the Student replies after this manner, let me say that, within a few days after the above-named occurrences, he invited me to visit with him a woman, more than two miles distant from the before-mentioned dwellings, and whom we found moribund with childbed fever. He was greatly affected by thus finding his patient in the article of death, and as we left the door together, he said, "Am I not singularly unfortunate? Here is this poor woman now dying, while in yonder house, a little way off," pointing to it, "lies another patient of mine, who is likewise dying. What a singular coincidence of cases! That case, over yonder, is one of a woman whom I have repeatedly assisted in her labors. A good while ago she sent me a message to engage me to wait upon her about this time. Having heard nothing from her, and being anxious on account of this epidemic, I called at the house to-day, to learn if she was well. I was told that, having been suddenly seized with labor, and rapidly delivered, they had not been willing to trouble me to call. That she had continued quite well for a day or two, but now was very sick, and would be glad to see me. Upon approaching her bedside, I found her irrecoverably ill with childbed-fever, and she is actually in a dying state."

Such was the statement of my medical friend; and I have related it in order that I might next ask the Student to see, in the circumstances of the case, the undeniable proof that strange, inexplicable coincidences may cause one medical gentleman to be tracked, as it were, by childbed fever cases, without any complicity of his person or clothing in the causation of them. In this instance, he had not seen the woman until he found her perishing; in the other, if he gave the malady to Mrs. A, and did not give it to Mrs. B, did he communicate it to Mrs. C? and, if he did, where did Mrs. D find it? I said he lost sixteen patients out of a great number. Did he give it to number one? No. Did number one enable him to transfer it to number two? No. Why should the Student believe (he cannot know) that he gave it to number three, since number four unquestionably did not receive it from him? Well, then, if number four did not receive it from him, why should the Student charge him with giving it to five, six, seven, eight, nine, and so on to the last of the melancholy list? For my part, I am sure he neither did nor could communicate it to anybody. If the Student still insists that he was the conveyer of the poison, how did he convey it? Had he himself the disease? No. Did he convey it in his clothes, or hair, or scarf-skin, or in his pulmonary or cutaneous halitus—which of these? But another friend of mine who had been *chased*, so to speak, by a series of such cases, seventy in all, left the city, was absent many days, and on returning, shaved his head, got a new wig, new clothes, new gloves, new pencil. He went into a bath, was washed clean, dressed himself, and then visited and assisted a woman in labor who was seized *next* day and died. Prussic acid, or arsenic, or nicotine, would hardly be more poisonous than such a gentleman, if he *was* poisonous, which he was not; he was only unlucky in meeting with the epidemic cases. I say he was not poisonous; but, if the Student insists he was poisonous, pray, how was he so? Not in his hair, which was cut off; not in his dress, it was new; not in his health, for he was in good health; everything, except the man, was new. He could not have carried the atmosphere of his last patient's chamber with him to the country, keep it about him like an invisible cloud, during many days; and then, after a bath, carry it into the last patient's chamber to destroy her with exhalations more pestiferous than the breath of Cacus. I have just now, since writing the last sentence, read again the observations upon the contagion of childbed fever, by Dr. Robert Lee, beginning upon page 487 of his admirable *Lectures on the Theory and Practice of Midwifery*, 8vo. 1844. No author has given or can give a clearer or more candid detail than his of the motives to believe or reject the contagion, as a cause, as far as those motives are discoverable in the observed cases. The esteem and veneration I feel for that wise and good man, Dr. Lee, are so great, that, if I could believe because any living physician believes a dogma, I should believe it because he does. But Dr. Lee does not believe; he only suspects and fears. At page 489, he says of the facts, that, "though they have led me to adopt the opinion that the disease is sometimes communicable by contagion, and sometimes has a connection with erysipelas; they have not, perhaps, been sufficiently numerous, and of so decisive a character, as to dispel every doubt on the subject of its contagious or non-contagious nature, and prove that it is a specific inflammation. It is but right to state that, in a vast majority of cases, the disease has occurred, and in the most destructive form, where contagion could not possibly be supposed to have operated as the cause."

Dr. Lee gives a summary of opinions of past writers, whom I shall not cite for want of space in this volume.

I refer to a special work on this subject which I published in 1854, entitled *Treatise on Childbed Fever* for an elaborate statement of the argument, both for and against the contagion of childbed fever, and I am willing to leave the subject there, for I am persuaded that if my exposition of the doctrine of this contagion, in that treatise, is insufficient to bring the reader over to my way of thinking, I at least can never convince him, and must be content forever to let him alone in his phantasy.

Let not the Student charge me, then, with ignorance of the facts relative to the so-called contagion of our dreaded disorder. I am by no means ignorant of them as they are stated by numerous authors; and having, moreover, conversed on the subject with many of the most eminent living accoucheurs, both at home and abroad, I am ignorant neither of facts nor opinions; I even wholly reject the contagion of scarlatina, measles, and pertussis, as I do that of yellow fever and cholera. And I shall here take the liberty to excuse myself to my brethren who have opposite views, beseeching them to observe that, while I contend for the faith I have, I do not condemn *them*, however I may dissent from their *opinions* on these points. Let them therefore, in like manner, condemn and confute my *opinions* on childbed fever contagion, and, if possible, pardon *me*.

A man living by the edge of a swamp or mill-pond, in September and October, is very likely to have an attack of intermittent fever. A marsh-miasm makes him sick, and that after a particular manner. But what is the marsh-miasm? No man hath answered that question; and yet, everybody agrees there is some unknown relation betwixt the swamp and the morbid phenomena observable in the man, and that unknown relation is expressed in the word miasm. In like manner, a woman delivered in a lying-in ward of the hospital, falls sick with childbed fever. She is the first on the list; but her case may be followed by ten or by two hundred other cases. As to the marsh-miasm, I know it not; I only know that it is; and, in like manner, I know not what the ward-miasm is. I do know, however, that it is. The marsh-miasm makes sick unto death. The ward-miasm makes also sick unto death. A hundred men shall fall sick in the Valteline, or in the Campagna, and a hundred women shall fall sick in the hospital. Which is a contagious cause, and which is not a contagious cause? The Student may say he suspects the ward-disease to be contagious, but let him not say that he knows it to be so; *πιστις* and *γνωσις*, belief and knowledge, are very different states of the human understanding.

Let him say, if he will, I know that Mrs. A communicated her epidemic childbed fever to Mrs. B, and I know it, because Mrs. A died on Wednesday in the same ward with Mrs. B, who took it and died on Saturday. If the Student should thus speak, I must reply to him that, as he admits it arose spontaneously in Mrs. A, he ought not to assume that it could not spontaneously arise in Mrs. B. In such a contagious malady as smallpox, if A be sick with it, and B come into his house, and after some days of incubation should fall sick with variola, he has a reasonable inference from A to B, and that inference is confirmed and reduced from belief or probability to knowledge, because he knows he could have taken lymph or pus from A, with which to inoculate B; an inoculation that could scarcely fail to produce smallpox. But, in childbed fever, he can have no such reasonable inference, since he cannot inoculate B with the malady of A, and knows not where to look for any virus, and has not the least notion of what or where the cause is. In smallpox, though he cannot know what the cause is, yet he can and does know where to look for it, and he always finds it combined with or contained in the lymph or pus of a variolous pustule.

Inasmuch as we cannot know what the essence of a miasm or contagion is, we ought to examine ourselves—that is to say, we ought to pry into our understanding, and see, if possible, whether, under these mysterious circumstances, there is not discoverable some principle, some law or fact, whether in our own understanding, or in the nature of the patient, which, being duly comprehended, might lead us to absolute knowledge upon this subject, and so, free us from miserable doubts and misgivings of duty; and to this end, it seems to me that such a self-examination must result in this, namely, that a miasm or a contagion, can act only on the sensitive element of bodies, just as medicines act solely by the impression they make upon the same sensitive element. As medicines do not act upon the dead body, neither can miasms or contagions affect it. Miasms and contagions are in the same category of powers as medicines.

Every person who has paid some attention to what is called method, or classification in Natural History, knows that the whole of the zoological series have been arranged upon the principle of the subordination of the organs.

"Vertebrate animals possess a trunk, on the sides of which all their parts are symmetrically arranged, because their nervous system consists of a central medullary cone, from each side of which proceed, in symmetrical order, the nerves of all the parts. The body of a mollusk is a lump, because its nervous system is confused; the articulates possess a greater degree of symmetry, because their nervous system is, to a certain extent, symmetrical; their body is articulated exteriorly because the nervous system is so within: in fine, even in the radiated animals, the last vestiges of a nervous system, to be traced in them, have the same radiate form which their whole body has."

"The form of the nervous system, therefore, determines the form of the entire animal, and the reason why it is so is plain; it is because in fact, the nervous system constitutes the entire animal, all the other systems being added merely to serve and maintain it."—*Flourens.*

The above paragraphs, from p. 88 of M. Flourens' *Analyse Raisonnée des Travaux de Georges Cuvier*, are cited to confirm the proposition that the nervous mass is, in fact, the only part or element upon which medicines, miasms, or contagions can act; and that, if it be true that the animal is what it is, in consequence of the arrangement and distribution of the nervous mass within it, then we may discern, in states of the nervous mass, causes why the organs should become pathological seats, instead of continuing to be the seats of physiological action or force.

The nervous mass, then, is not only the elaborator, but the creator of its organs; maintaining their health and life, or, loosing the reins of government, allowing them to fall into disease or death.

I pray the Student, then, to look upon the nervous mass as a unit, with power to assume the form of encephalon and cerebro-spinal axis, sympathetic system, ganglion, plexus, nerve-fibril, or nervous-molecule: wherever it is, it is the unit nervous mass, all whose items are bound into one co-ordinated whole by the centralized power existing in the medulla oblongata.

This unit-mass may extend or protract itself, and evolve itself into the form of optic-nerve and retina, lung, gland, spleen, hand, heart, ear, alimentary apparatus, skin, muscle, capillary vessel, joints; in short, it extends itself and becomes organ, in order to maintain itself by perpetual supplies of alimentary material and oxygen. The organs and all the parts are its machinery, to which it supplies the necessary power, and which it withholds from them when it is itself become incapacitated.

If the nervous mass is thus the regent and supreme dominator of all the parts, it can only be so when the necessary conditions of its own normal existence are present; but the nervous mass is subject to induration, to ramollescence and pressure—to too little pressure—to strength—to weakness—to various pathological states, and to death. To point the finger of scorn at a man, arouses in an instant the fiercest passions of his soul. To blast him by some spectacle of horror, is to make every fibre tremble and quiver. To appeal to his human sympathy, is to melt him into the softness of the woman or child. To heat him with wine, to anæsthetize him with chloroform, to cast him under the therapeutical force of antimony, or mercury, or opium, is to alter the state and force of his nervous mass. To place him, in autumn, near a malarious swamp, is to bring his nervous mass under the altering influences of the malaria: but, to deliver a woman in a lying-in ward filled with the cause of childbed fever, or in a town or district wherein the cause of childbed fever is become, by some constitution of the air, epidemical, is so to modify, by means of the malaria of the town or ward, her nervous element, that, after delivery, she shall give manifestations of this morbific power in a peritonitis, or metritis, or metrophlebitis.

Let not the Student invite me to show what are the modifications of the nervous mass, brought about by the ward-malaria. I know them not—any more than I know the modifications of the encephalon effected by the operation of the causes of rage, terror, sympathy, or heaven-descended charitableness that divides its cloak with the beggar. *Medicina non agit in cadaver* is a true saying. What modification is it of the nervous mass, that leads to the therapeutical effects of ipecacuanha or tartar emetic doses? Again I say, *medicina non agit in cadaver.*

As to peculiar states of the nervous mass brought about by means of the epidemic cause of childbed fever, their existence will not be denied by the contagionists—who, at most, only accuse physicians and nurses of transferring, by their person or dress, the *cause* from patient to patient. These very contagionists contend for some identity in the causation that renders the congener, erysipelas, rife during childbed fever epidemics. But they contend not for the contagion of this erysipelas.

Contagionists will hardly contend, that an incubation of a few minutes can suffice to awaken the fatal train of symptoms—but, and here is the rub, in epidemic childbed fever, women are sometimes attacked, sickened, and destroyed within twenty-four hours, or even within eight hours, after the close of the labor. Kiwisch has observed this frightful rapidity of dissolution. Puzos and many others have seen cases to prove fatal in twenty-four hours. Epidemic constitutions of the air may so affect the state of the nervous mass, as to give a wide-spread reign of synocha, or typhus, or yellow fever, or plague, or cholera, or black death, English sweat, or childbed fever, whether synochal or typhal: during the reign of a great epidemic, only those that fall sick appear to have been brought within the range of the causation. Yet it cannot be doubted that, of a population consisting of 100,000 souls, among whom 5000 only manifestly fall sick under the epidemic, the multitudes of the population who have resisted the cause, though exposed to it, greatly exceed in number those who have been disordered by it. In a crowded lying-in hospital there are many servants, and pupils, and physicians, and other officers. There are also many unmarried women, as, for example, Sisters of Charity, who wait on the sick. Ofttimes the lying-in wards are nigh to fever wards, or wards for the wounded. How is it, then, that this potent contagion, which destroys like the most virulent poison, even in a duration of only eight hours—how is it, I ask, that other human beings, females and males, are never even suspected to be in danger, while a pregnant or lying-in woman is looked upon as in the greatest peril while she stays in that house, breathing the same air, living on the same food, and in all respects, save her pregnancy and lying-in, in like circumstances with the other non-pregnant women, men and virgins by whom she is surrounded, and who maintain their perfect health. If the contagion is a contagion, it must be a specific one, and very curiously specific, if it specifies only the *accouchée*. How can the Student regard it as specific in this sense? How can he, in fine, hold it to be a contagion? Is there a contagion specific to the pregnant woman, and of no power over the bodies of other women, of children and males? As well might the Student say that pregnancy has changed and subverted the specific character of the woman. It would be nonsense to say-so. Yet if he be a contagionist, he will persist to say that a doctor who is a gentleman, and who cannot by any means be made sick by this contagion-cause, cannot come near a pregnant woman to feel her pulse and make her poke out her tongue, without killing her!

But, if the Student should incline to say that the cause, though it may have been originally generated within the house, as marsh-miasm is generated in the swamp, is yet capable of reproducing itself in the economy of the sick woman, and so become contagious; nay, that it may adhere to and even be transported by her medical attendant to considerable distances, he ought, at least, to say that time is required for the operation of the cause. Such operation cannot be instant, and without incubation. Smallpox, whether taken by ordinary contagion or by inoculation, and syphilis also, must have an incubative stage. But, in our disease, the woman may be attacked and lost before the lapse of twenty-four, or even eight hours. Will he still incline to say, that the physician carried the poison from the last patient and killed the woman in eight short hours? It seems to me that this statement serves to show that the woman must have been brought under the range of the cause before the commencement of her labor; and, if so, then certainly not by any infection conveyed by the attendant, but only by the epidemic force which may have been acting upon her nervous mass for many days. How many days? Shall we say one day, or a week, or a fortnight? But, the cause of epidemic childbed fever covers, like an overshadowing cloud, a whole city, state, or continent. It may have silently operated for a month or more before the explosion.

Is it not idle, then, to look to human contagion as the cause, when we know of a surety that epidemic constitutions of the air may comprehend within their morbific scope thousands or millions of the population who shall not in a single instance sicken under it, except after the application of a proper and competent exciting cause?

I repeat that as the epidemic-cause of childbed fever cannot affect any others than women, pregnant or lying-in, it must, therefore, be a feeble cause—else it would produce disease in unmarried women and girls, as well as males. Still, it is powerful enough so to affect the nervous system of pregnant and lying-in women as to give them a propensity to be seized with these puerperal phlegmasias. The three forms of childbed fever are each pure forms of non-specific phlegmasia. They are terrible in their rapidity and mortality, because the lying-in state requires only that a disk, an area of inflammation, should be once established; which being done, the area expands like the circles of wave in a lake wherein one has cast a pebble: the motion is propagated to the shore.

It is not improbable that states of the mind brought about in pregnant women, by rumors of numerous fatalities, may exert an injurious influence on the nervous mass, which becomes weakened and disordered by states of the soul, inviting to the attack. I heard of a soldier who was sick in Mexico. He longed to return to the United States. The physician who examined him found him little indisposed. The soldier had the keenest desire to visit his home, and said, "Will you let me go home, sir?" Being roughly refused, he turned his face away, and was dead in a few moments. Now here was a case in which a word conveying a bitter disappointment caused the nervous mass of a man to lose its power over the organs. It resigned its authority over the dominions it had controlled, and a momentary anarchy led to their total dissolution. Is it wonderful, then, that a woman, whose ears are filled with terrifying reports of epidemic childbed fever, or whose eyes have witnessed the dissolution of numerous inmates of her own hospital-ward, should allow a non-specific inflammation to fix itself upon the womb, or ovary, or venous sinus, whose area, augmenting like the wave-circle in a calm lake, should speedily reach and disturb every part of the economy?

For the most part, a woman who has been confined, and who has got quite rid of all the uterine products of the gestation, remains in a quiet and comfortable condition as soon as she shall have somewhat recovered from the fatigue of the conflict, and got over the smarting and aching sensations left by the transit of the child through the organs. If she be confined for the first time, she is little apt to suffer from those after-pains, with which others are troubled who have borne children before.

The blood shed by the empty womb, flows out upon the napkins placed to receive it, and a few small coagula formed within the uterus or vagina are in good time expelled; and the pulse, the respiration, the temperature, and psychical state of the woman present no motives why we should apprehend any attack of disease. Twenty-four hours pass in this quiet way. Perhaps the lower belly is somewhat sensitive to the touch, but it ought to be a little so. She takes light food, and convenient drink. She is kept neither too cold, nor too warm. She does not leave the bed, nor even sit up in it. She sleeps well. She applied the infant to the breast, and has given a little milk. Forty-eight hours pass in the same favorable way, the milk gradually increasing. She sleeps during the first part of the second night, but at four o'clock in the morning she awakes to nurse the child, and then she observes that there is a degree of soreness or painfulness in the hypogaster, as she turns to adjust the breast. She becomes chilly: a rigor of positive character comes on, which sometimes amounts to an ague-fit, with chattering of the teeth, trembling, and a sense of distressing coldness along the spine: the fingers, toes, ears, and nose are cold to the touch, and now the pains in the uterine region become severe. She no longer can bear to have her binder pinned tight, or suffer the nurse's or her own hand to be pressed upon the part. Sometimes these pains are so violent as to draw cries and even screams alternated with moanings from her lips. She lies upon the back, and draws up the knees, for she cannot extend the legs without increasing the pain in the lower bowels. If she have occasion to change her posture or turn in bed, she does so with great precaution, because the least change of posture augments the distress. If she happen to turn upon the side, she seems to feel that something within falls heavily towards that side, and draws or drags other parts painfully along with the heavy, and fleshy, and sensitive womb. If she should happen to cough, the agony occasioned by the effort and shock is unspeakable.

In half an hour, in an hour, or in two hours, less or more, the chill is gone off, and the face is become red; the hands and feet are hot; the respiration is quick and short. She can not dare to take a full breath, because, in doing so, the great descent of the diaphragm too rudely and painfully moves the parts beneath it downwards, towards, ainst the sensitive areas of the phlegmasia, which can tolerate no disturbance nor rude touching. Hence, she breathes with a quick, frequent respiration.

during the rigor, the pulse is counted, it will be found beating undred and twenty, or perhaps one hundred and forty times to inute; the artery being small and wiry, with a quick and sudden e of the systole. As the chill goes off, the pulse increases in out lessens a little in frequency, as the hot stage begins to develop

The hot stage makes progress; the area or inflamed disk ex-s, and, as it does so, causes the woman to experience frequent , momentary rigors, that are insufficient, however, to arrest the ess of the hot stage. In proportion as the area of phlogosis ges, so does the constitutional reaction against it augment. The of the heart becomes more and more energetic; the systole is again frequent and sudden; the temperature of the body increases in ame ratio, and a hot stage is soon fully established. During the ement of the hot stage, the area of inflammation expands rapidly. der the predisposing conditions arising out of the woman's puer-state, this reaction spreads out the area of inflammation more more until it transcends the boundaries of the pelvis, where it irst established; it migrates upwards on the peritoneum covering iac muscles; it inflames the serous coat lying behind the muscles belly; it creeps up along the meso-rectum, and the sigma of the ; it burns like a raging fire in the loose and movable peritoneum e omentum: the whole colic arch is inflamed; the meso-colon; esenteric and intestinal peritoneum are involved; it takes hold e stomach, passes along the serous lining of the liver, and fastens on the vault of the diaphragm, and the abdomen becomes tym-ic almost to bursting. Under the overthrowing power of such a lication of inflammations, the nervous power is demolished. The has become tympanitic; the respiration and calorification are rbed and lessened; and the blood becomes more and more venous character, as the neurosity grows less and less under the lessen-ëration of the blood. The countenance and the skin undergo the rkable changes so often signalized. The stomach gives way eructations, regurgitation, vomiting of yellow, green, blackish , and lastly black-vomit. The nails are bluish, and the lips also; ain has ceased; the pulse grows small, thready, vermicular; it s at the wrists, elbows, and axillæ, and at last the heart lies still; oman is dead, the child an orphan, the family altar is overthrown e divinity that presided there takes its flight to the unseen l.

This is a picture of the progress of a childbed fever assuming the form of puerperal peritonitis. The sketch I have presented is a rapid one; but it seems to me that many women have begun and matured the whole progress of the events I have related, in a little more time than I have employed to write these words. In common, however, the rate is not so rapid. As a general rule, my cases have begun a little later, as at the end of the third day; so that I suppose the seventieth hour is more likely to give rise to the first symptoms than the forty-eighth hour after delivery. Still, it is not to be denied that, in multitudes of women, the area of phlogosis is first laid during the labor, or even before the commencement of it.

I hope the Student will allow me now to remind him of what I have before said, namely, that the serous coat of an abdominal viscus is an essential part of such organ; and that inflammation of its serous coat is, virtually, inflammation of the organ itself. But in my statement of the progress of the disorder I have asserted that the original area of the peritonitis has become expanded, or that the inflammation has migrated beyond the bounds of the pelvis, and has at last fastened itself upon each and every of the abdominal viscera and the diaphragm. This I regard as a true account of any one of the bad cases of peritonitis. The Student would expect, even were the area of inflammation confined to the limits of one broad ligament, a very hazardous constitutional reaction from it; what shall he expect when every viscus is become inflamed in the progressive expansion of the area!

When the whole peritoneum of the colon and small intestines becomes involved, the peristaltic muscles, lying underneath their serous coat, must lose their power, and the whole tractus of intestine become distended with gas, just as a paralyzed bladder suffers itself to be filled to bursting with urine upon which it cannot contract to expel it. In like manner, the inflamed bowel fills with gases extricated within them, so as to produce, first, a state of meteorism which soon becomes an enormous tympany. The woman's abdomen begins to expand, in a short time after the inflammation has ascended upon the bowels, and then speedily becomes larger than it was before the birth of the child. I have seen some women in whom the abdomen was tense as a drum-head, and perfectly sonorous under percussion.

The nervous system ought very soon to succumb under the torment of such a vast area of inflammation; but there is another influence that tends quite as rapidly to sink it under such circumstances; it is this: the diaphragm has not free play any longer, to descend, as the respiratory piston, to the proper point in the cylinder of the trunk; for whenever the woman would make a free aspiration of air, she is revented by the pain; for as the diaphragm goes down, carrying verything beneath it in a downward direction, its pressure upon the nflamed bowels gives rise to torturing pain, so that she will not, if he can, and cannot if she will, take a full and perfect breath. To reathe imperfectly, is to oxygenate the blood imperfectly; and hence, his great and painful tympany soon comes to interfere with the aëraion of the blood, and consequently with the innervative power which epends upon it. The constitution thus sinks rapidly under the ouble influence of a commencing tendency to asphyxiation and an inolerable burden of perceived irritations. All the writers notice a peculiar expression of the face in women in childbed fever. The countenance has a peculiar leaden hue, which it acquires in consequence of the mperfect aëration of the blood just explained; and this it is that gives he peculiar childbed fever physiognomy, so much spoken of in the ooks.

Moreover, when the bowels become thus greatly distended, their uperficies of inflamed serous membranes expands *pari passû*. There s little hope, therefore, to effect the cure of the serous inflammation y resolution; it can come to its term only by effusion and adhesion, r by gangrene. The latter result is not to be expected, since the woman must die with an irritation so terrible, even before it could each the point of passing into gangrene.

In some women, as soon as the bowels have become thus greatly nflated, a total stoppage occurs by what I have called angulation of he gut. For example, if the colon should be greatly distended, its eturns, instead of being effected by arcs, are effected by angles; but a hollow cylinder, suddenly bent at an acute, or even right angle, will hut its cavity at the angle, so as not to allow even gases to pass. If he Student would roll up a sheet of paper into the form of a hollow ylinder two inches in diameter, and bend it so as to make an acute ngle at the return, he will find that he cannot even force his breath hrough it. This is what happens in some of these cases. The bstruction becomes absolute and complete, so that neither liquids nor ases can pass; and the case becomes an iliac passion to all intents nd purposes, and the woman dies as surely as if a ligature were pplied and strictly tied around the gut. I have met with such instances, and proved them by dissection. No medicine can operate. The largest doses of calomel, senna, jalap, salts, croton oil, or elatin, re alike unavailing, for such angulation of the gut is a mortal accident. I saw a woman, attacked at 4 o'clock A. M., who at 11 A. M. was dying, under these very circumstances. It was in vain that any efforts to rescue her were made.

While these consequences flow out of the serous inflammation of the intestines, what must be those resulting from the serous gastritis? Every person who has witnessed the cases must be familiar with those fatal signals that are early presented in the first gastric eructations of thin mucus mixed with ingesta; soon after which appears a yellow-tinted fluid, that comes at last to be greenish, verditer, dark green, darker, black and granular, and at last black vomit. These are the signs and fruits of an inflamed and dying stomach and duodenum.

Why need I further cite the serous hepatitis and paraphrenitis? It 'is enough to say that we have allowed the area of phlogosis to expand, to mount above the plane of the superior strait, and invade, as a fire in a prairie, every tissue that can be a fitting prey to the flame!

The Student has here, as I hope, acquired a clearer view of the nature and progress of a case of childbed fever, under the most ordinary form of puerperal peritonitis; and what I most desire is, that he should solemnly reflect upon the idea of an area of inflammation beginning within the pelvis, of a small superficies at first, but allowed by him to transcend its original limits and at last pervade everything within its reach. I feel sure that he will not look with surprise upon the woman who, under such circumstances, seems to sink without a struggle for life, her functions perishing, one by one, until the medulla oblongata at last ceases to excite the motor cord of the vagus nerve, which is death.

In the progress of the various operations I have depicted, the woman reaches a stage of the inflammation in which nature attempts the cure by effusion. As soon as the serum and sero-pus, and copious albumen begin to exude from the serous surfaces, the pain is mitigated, becomes rapidly less and less, and is soon all gone. The belly still continues to be large. If angulation has taken place, it will never subside; but if not, then, when the effusion has occurred, the abdomen becomes softer and less resonant, but still continues much distended. The inflammation is at an end, and it has come to its term by means of the act of effusion. By percussing the abdomen, we can now discover that the peritoneal sac is filled with a fluctuating liquid, and we know that the signs of melioration, so joyfully hailed, are but the disguised harbingers of doom. If the Student should read Gordon's account of the case of John Low's wife, he will have a most touching picture of the treacherous nature of this enthanasial melioration. When the effusions began, her great pain ceased, and, upon the doctor's arrival, they "received him with transports of joy;" but he saw that his patient was dying.

The Student ought very carefully to obtain a correct diagnosis of the condition of any woman recently delivered, who complains of indisposition. If he should make an early and correct diagnosis of the incipient areas of inflammation, which I have supposed to be the true beginnings of childbed fever, he could scarcely fail of success by a resort to the Gordon method, to be hereafter described. And I advise him to give his patients the benefit of any doubt that may be left after a due exploration of the signs; that is to say, if he remain in doubt whether the malady be inflammation or not, let him proceed with his method as if justly convinced of the existence of a veritable inflammation.

One of the most constant signs is a remarkable frequency and quickness of the pulse, with which, however, he cannot become familiar by mere book learning. One must feel the childbed fever pulse in a few cases in order to become familiar with the peculiar and informing impression it makes upon the sense of Touch and the mind. I shall no further attempt to describe it than by saying that it generally beats at least 120, and often 140, or even 160 strokes to the minute. The volume and resistance of the artery vary, even in the early stages, according to the constitution of the patient, the violence of the phlegmasia, its extent, and the force of the epidemic cause, or other cause.

Let the diagnosis between milk-fever and childbed fever be made with care: milk-fever may be accompanied with after-pains, with rheumatism of the womb, or with pure neuralgia of the pelvic and abdominal viscera, strangely connected with a tenesmic condition; or with retention of urine, or with retained coagula, or costiveness. I have met with many cases of supposed childbed fever, for example, that were by no means childbed fever, but only pain and irritation in the pelvis and belly, and a quick pulse and hot skin, caused by a tenesmic descent of the late gravid womb. In such cases, the abdomen is as tender and sore as it is in the most violent peritonitis, but it is instantly relieved by pushing the uterus upwards with two fingers in the vagina. If there be doubts about it, let them be cleared up by raising the womb upwards in the pelvis, and then by striking upon the sore abdomen to learn that the operation has wholly taken away all the pain and soreness, which it could not do if they were the symptoms of a real phlegmasia, instead of a descent of the womb. But, as I cannot devote, in this volume, a space sufficient for a treatise *in extenso* upon our disorder, I shall rest content with having indicated the above-named subjects of diagnostic research.

What can we do in these cases of childbed fever? What is our duty? Who shall show us any good? The profession is utterly divided upon the treatment that ought to be adopted. And I am quite sure that what I shall recommend will meet with reprobation in many quarters. Yet there ought to be, and there must be, a reason and a philosophy that ought to guide all scholars upon a question that seems to be so simple. Instead of this unity of thought and purpose, we are divided; and the Scriptures tell us "that a house divided against itself cannot stand."

I may venture to enumerate the following as the principal remedies in vogue for the cure of such cases as I have described:—

1. Bloodletting; 2. Leeching; 3. Cupping; 4. Emetics; 5. Cathartics; 6. Stuping and poultices; 7. Blisters; 8. Turpentine-oil; 9. Opium; 10. Mercury; 11. Tartar-emetic; 12. Enemata. These are all that are in common use. In order to seek for some choice of method, I shall inquire *seriatim* into the utility and reliableness of each of them.

Bloodletting.—It appears to me that whosoever shall accept those views of the nature of childbed fever that have been herein set forth, must also regard the use of bloodletting as an indispensable element of any method of cure for the disorder. The Student, who truly desires to become acquainted with this great subject, will have examined the history of medicine, and will have made himself familiar with the literature of the subject. He will have learned that, so far back as the age of Hippocrates, the abstraction of blood was relied upon as the most hopeful and safest recourse; and that, throughout the lapse of the centuries of medical history, there have always been some physicians to trust in chief to this remedy. It could not well be otherwise with men who had taken advantage of occasions to examine the nature and extent of the inflammatory lesions exhibited in the dead body. Eucharius Rhodion, Mauriceau and Guillemeau, Lamotte, Puzos, and many others, were persons who had clear views of the phlogosis of childbed fever, and they became in consequence good bleeders; bleeders *coup sur coup*, as Puzos expresses it.

The notion, the false notion, that the disease is a fever, still continued to mislead, as it still does, many good and wise men; and even of those who clearly perceived the phlegmasia, not a few appeared to have been dominated by the notion of a fever to that degree, that, while they boldly advocated venesection in their writings, they became appalled in presence of the cases, so that their practice, as in Leake's case, and Denman's, fell far short of their promises and expectations.

It chanced that, in 1789, an epidemic childbed fever began to prevail at Aberdeen, and in the neighboring villages and districts, which proved fatal to many women. None of the medical men then in practice at Aberdeen were acquainted with the disorder, though the same epidemic had been fatally prevalent there in 1760; but the practitioners of that date were now all gone off the stage.

At that time there lived in Aberdeen a physician, Alexander Gordon, who was largely engaged in Midwifery practice; he was a person of sound judgment, of great probity, and truly zealous for the truth. The cases that came under his care proved fatal, one after another, so that out of the first seventeen women whom he attended, he lost nine. Gordon had not cleared his understanding from the pernicious influences of the traitorous word fever; and therefore, through all the tribulation and distress of so many losses, he was never enabled to behold the simple truth of the case, until, upon the death of Isabel Allan, his seventeenth patient, he procured permission to examine the dead remains. The following is his description of what he observed. Let the ingenuous Student read and carefully reflect upon it, with the view to learn what could, what must have been the state of the serous investment of the belly, that could have led to such effects.

"Upon opening the abdomen," says Gordon, "I found the peritoneum and its productions, the omentum, mesentery, and mesocolon, in a state of inflammation. The omentum had lost about half its substance by suppuration. The mesentery and omentum, and all that part of the intestinal canal with which they are connected, were very much inflamed. But the disease appeared more especially to occupy the right side; the right ovarium had come to a suppuration; the colon, from its caput along the course of the ascending arch, was much inflamed and beginning to run into gangrene. A large quantity of pus and extravasated serum appeared in the cavity of the abdomen, which, when taken out and measured, amounted to two English pints. The peritoneal coat of the uterus was inflamed, and the organ itself not so compact and contracted as it ought to have been. Upon opening it, its cavity was found covered with a black-colored substance, which at first had the appearance of mortification, but, when wiped off, was nothing else than the membrana decidua in the state in which it naturally is about this time."

The truth here flashed upon Gordon's mind. A thousand speculations, ten thousand essays like Hulme's, centuries of fixed opinions that childbed fever is a pyrexia, weigh less than nothing in counterpoise of these proofs; that it was a phlegmasia Gordon now knew.

Henceforth, throughout the remainder of the Aberdeen epidemic, which as I have said began in 1789, and prevailed until 1791, Gordon walked in a path of light. He emerged from the gloomy and doubtful track along which he had previously stumbled and groped, amidst clouds of error, and accompanied with phantoms of the imagination to mislead and baffle him. He saw that the disease is an inflammation, to be combated by antiphlogistics, of which the chief is bloodletting. But he rightfully judged that, to bleed merely, is not to cure; for he judiciously resolved, in using the remedy, so to apply it as to kill the malady at a blow—*jugulare febrim.* He considered that, like the fabled hydra, its multitudinous heads must be stricken off at a blow, and that, if struck off one at a time, they were only the more speedily reproduced.

Gordon says: "The method I proved most successful was, by copious bleeding soon after the attack of the disease." * * * "When I took away only ten or twelve ounces of blood from my patient she *always died;* but when I had *courage* to take away twenty or twenty-four ounces at one bleeding, in the beginning of the disease, the patient never failed to recover." * * * "If, therefore, a practitioner is called to a patient in the beginning of puerperal fever, he must never take away less than twenty or twenty-four ounces of blood at one bleeding; otherwise he will fail in curing the disease." "I know that this will be thought too large a quantity, by those who never take away more than eight or ten ounces of blood from their patients; but such practitioners would never cure puerperal fever; for, unless a practitioner venture to take away the quantity mentioned, it would be much more prudent in him not to bleed at all, because his patient will certainly die, and the bleeding will be blamed." * * * * "And I felt this prejudice in its full force, when I had not courage to take away more than ten or twelve, or fourteen or even sixteen ounces, of blood from my patients. But when I had resolution to take twenty or twenty-four ounces at one bleeding, I disregarded it, because I was sure that that quantity, taken away within six or eight hours after the attack, would certainly cure the disease, and that of course there would be no clamor against the bleeding. But, when I was not called at the beginning or soon after the attack, I did not bleed at all." * * * * "Now, when I was called early to patients in the puerperal fever, and had courage to take away twenty-four ounces at one bleeding, I never failed at once to cure the disease." * * * * "After much experience in the disease, and mature deliberation concerning the conduct most proper to be pursued in my peculiar situation, I came to the following resolution: If called to a case within twelve hours after the attack, I insisted on bleeding the patient, and promised for its success; but if at a later period, or from twelve to twenty-four hours after the attack, in that case, like Sydenham with the same remedy in the smallpox, I thought it incumbent on me to propose it as the only effectual remedy, but I neither insisted on it nor promised for its success."

Many valuable publications upon childbed fever have appeared since the date of Gordon's work. It is not very long since I procured to be published, through the approbation of Dr. John Bell, now Professor of the Practice of Physic at Cincinnati, a volume containing, first, a short article on puerperal fever, by myself, designed as an introduction to the rest of the volume, which consists of the works of Gordon, Hey, of Leeds, Armstrong, of Sunderland, and Robert Lee, of London, on puerperal fever. I have considered that the doctrine of those four authors, as to childbed fever, is so clear, and so clearly descriptive of the facts, and the treatment by bloodletting, set forth in a light so true, that it might serve as a sufficient text and guidebook for the brethren in this country, many of whom cannot have access to rich libraries of medicine. I am still of the opinion, that all those who shall truly possess themselves with the contents of that collection will be well informed and safe men. Safe, I mean, for the public.

While I so confidently recommend the above-named authors, I still more sincerely wish that all the American accoucheurs could read the essays of Tonnellé, of Legouais, of the younger Baudelocque, of Meissner, Kiwisch, and other good writers, who have seen the truth and told the truth as to the phlogistic nature of the malady, and the necessity there is for an antiphlogistic method. I feel sure that few reasonable, well-thinking men could read them without coming over to our opinion. As to the statements contained in the above extracts taken from Gordon, I subscribe to them as the truth, pure and simple, for I know them to be true as to my own experience. His experience amounted to seventy-seven cases; mine goes far beyond that number, and all that I have saved have been saved by the lancet. I am indebted in chief to Gordon for the privilege of standing on a platform, from which I can look over and beyond the mere signs, and discover the things, which they but outwardly represent. In the failing pulses, and amidst all the disheartening evidences of the typhal state, I can look upon the expanding area of the inflammation as the cause, and the sole cause of the declension of the forces, and the overthrow of the functions. If I cannot cure her by venesection, my patient may recover by the providence of God. All other human means seem to me to be useless and beneath contempt, as prime remedies, venesection being omitted.

Hence, my advice to the Student is to learn to confide in venesection as the sole therapeutical hope; but, in the meanwhile, continuing the other remedies, which are but the juvantia and adjutoria of the masterful and hopeful chief and leader in the conflict against this dreadful, most fatal disorder.

Gordon points out twenty or twenty-four ounces as the proper quantity of blood to be drawn in the early stages of the malady. Probably, he has in this hit upon the happy medium, and I most warmly advise the Student to follow him. Still, the question as to a second venesection will often arise, and I am by no means willing to say that another bleeding shall be regarded as imprudent at a later stage. It is clearly incompetent for any man to determine, beforehand, that twenty-four ounces shall be sufficient in all constitutions alike to effect the cure; and certainly some women may bear, and even require to have taken away thirty ounces, or even a larger quantity. What I most desire in the Student, and what I thank Gordon most for, is the earnestness with which he fixes the lowest limit at twenty ounces.

Let the Student read Hey, Armstrong, and Lee, Legouais, Baudelocque, Dance, Meissner, and Kiwisch, to discover more clearly, if possible, the grounds for defending the antiphlogistic treatment.

It is true that this treatment is combated in very high quarters, and among others by that most excellent and worthy writer, Dr. Robert Collins, of Dublin. This gentleman's experience in the treatment of hospital cases, which was considerable, led him to the opinion that bleeding is not the proper remedy for those cases, however much it may be applicable in out-of-door patients. He says, "at least, in *four* epidemics which I have witnessed, the symptoms were usually of the lowest typhoid description, the pulse being so feeble and indistinct, as to make you dread, in many, even the application of leeches," &c.

Dr. Collins had charge of eighty-eight cases, of which thirty-two recovered, and fifty-six died. Only fifteen of the eighty-eight were bled, of whom seven recovered, and eight died. He adds: "The result of my observations upon the treatment of puerperal fever is, that general bleeding, except when there is a strong full pulse, and the symptoms are of a highly inflammatory character, is injurious." Such are the words of Dr. Collins, from which it is plain that he entertains views of the malady different from those I have in this chapter set forth. I look upon the cases of peritonitic form as being invariably dependent upon a primordial area or disk of inflammation, which ought to be limited and then *resolved* by early venesection.

Upon examining Dr. Collins's cases of fatal disease, the No. 60, page 424, gives us the example of a woman delivered at 4 P. M. on the 12th. On the 13th, had slight pain in uterine region; pulse quick; an oil draught. In the afternoon, pain greater; soreness; hurried pulse;

moist white tongue. (The case probably installed early on 13th.) Four dozen leeches, &c. On the 14th, 9 A. M. (say twenty-four hours after the attack), she was in great pain, on account of which four dozen leeches had been applied at 1 A. M. Twenty-five ounces of blood were taken from the arm, which "she bore extremely well," though the venesection did not in the least relieve the pain.

At 9 P. M., the pulse being *full* and beating 138, she was again bled twenty-two ounces, which, with the twenty-five ounces before drawn, makes forty-seven ounces of blood; besides what was taken by four dozen leeches previous to the first bleeding, and two dozen soon after the second bleeding. On the 15th, the pulse 108; on the 16th, 108; 17th, 120; 18th, 120; 19th, 132; 20th, 138; on the 21st she died, at 2½ P. M. In the course of the treatment, from the 12th, the day of her delivery, to the 21st, at 2½ P. M., say nine days, she lost forty-seven ounces from the arm, and had fourteen dozen leeches, four hundred and sixty grains calomel, and twenty-three grains of opium, five warm baths, constant stupes, and occasional draughts of castor oil and turpentine.

The above is an abridged statement of case No. 60, given by Dr. Collins; and I now beg leave to ask the Student to consider whether, inasmuch as the patient bore such large bleedings without sinking, and as she held on in the conflict during nine days, it is, or is not probable that Gordon's method, fully and fairly carried out, would have saved her life. She was delivered on the 12th, at 4 P. M., after three hours' labor. On the 13th, A. M., slight pain in the uterine region; pulse quiet; but at 4 P. M. pain increased, *much* sensibility to pressure; pulse hurried. It was not until past 9 A. M. of the 14th, more than twenty-four hours subsequent to the establishment of the intra-pelvic area of inflammation, that the twenty-five ounces were drawn from the arm. Gordon advises us to bleed within six hours, and says we always cure, and I believe him. Nor can I doubt that No. 60 would have been made quite safe, had the venesection been performed at 9 A. M., or even at 4 P. M. of the 13th. Let the Student observe, further, that this was an *hospital case.*

I entertain so great, and so sincere a feeling of respect and veneration for the character of Dr. Collins, that I am prompted to omit the foregoing observations upon his case, No. 60, lest he might misapprehend the feelings that have led me to remark upon it. Dr. Collins is a person far more deservedly eminent in our art than I can ever hope to become, and his services to our science have obtained for him the applause of the whole Republic of Medical Letters. I trust, under these circumstances, that he will pardon me for selecting a case from a so high authority, by which (if haply I might succeed) to compare my own views of our duty and policy, in these trying difficulties, with his own. And I must aver that the case in question, coming as it does even from so eminent a source, cannot but confirm me in my adhesion to Gordon, Lee, Armstrong, Hey, Legouais, as well as to the multitudinous convictions of my own clinical opportunities, both in hospital and in town. I ought, however, to be very careful not to conceal any part of the grounds on which Dr. Collins rests. Those grounds are plainly set forth in his work, it is true; but, as some of my readers may not have it in their power to consult the *Practical Treatise on Midwifery*, &c. &c., by Dr. Collins, London, 1836, 8vo., I shall here insert extracts from a letter from that gentleman, which he did me the honor to write in the month of January, 1849.

"Merrion Square, Dublin.
"*January* 2, 1849.

"My dear Sir:—

* * * * * * *

"At pages 609–10 (*Woman and her Diseases*), you compare the mortality in puerperal fever under my treatment, and that of my distinguished friend, Dr. Robert Lee, of London, to prove the greater success, where general bleeding had been more frequently adopted by him.

"The GREAT and MARKEDLY DISTINGUISHING FEATURE between Dr. Lee's cases and mine, has, however, been overlooked; as mine were all HOSPITAL PATIENTS; whereas, his were all treated at *their own dwellings*. This was also the case with the late Dr. Gordon's patients, to whom you so deservedly allude.

"The disease with us, and I believe universally, is as different IN hospital and OUT of hospital, as it is *possible* to *imagine*.

"Please look to my observations, pages 390–1–2, &c., where I have stated the patient to be little more than SHADOW, and to exhibit the appearance of those laboring under *cholera*; so as to make us *dread* even the application of leeches. The fever is of the LOWEST TYPHOID character, with the pulse *so feeble* and *indistinct*, as to totally prohibit general depletion. This form of the disease is singularly intractable and truly fatal; whereas, the inflammatory form of puerperal fever, such as usually met with OUT of hospital, may be treated with considerable success.

"I should have stated that few physicians have witnessed the results of general bleeding to *a greater extent* than I have done; as the master of the hospital who preceded me, and to whom I was *Assistant*, was a STRONG ADVOCATE for it; but the mortality was so frightful, he was forced to abandon it. He bled *instantly* and COPIOUSLY, but with the most fatal results.

"Such is the character of almost all our *hospital* epidemics."

I am sure no man will have the hardihood to pretend that bloodletting is a cure for childbed fever. Bloodletting is not a cure, but a method, and only a method. There will, of necessity, be met with many cases which the method cannot cure. Still, it remains *the* method, and is preferable to all others, and, moreover, so very likely to cure, when duly and timely applied, that I cannot conceive of any other to be compared with it for excellency and safety. Indeed, I reiterate that the case which admits not of this method is one to be cured through the godness of Divine Providence, and not by the vain means left in our power after the subtraction of the prime and chief of them all. Bloodletting is the most manageable of methods. Nothing equals its power to control the circulation and the innervation, whether those of the whole economy or those of the diseased areas.

If the area have already comprehended the whole fundus uteri and broad ligament, a state expressed by rigors, by sensibility to pressure, pain, and febrile reaction, with the pulse at 120 or 140, surely there is nothing that man can do to equal in efficacy those states of the circulation, calorification, impressionability, and motivity, that he can bring about at will, with his eyes on the patient, and his fingers on the pulse, while he lets the venesection proceed. He can stop the jet now, or in half a minute, less or more. He can read the impression he has made upon the nervous, the circulatory, and motor forces, in their indexes in the countenance, in the pulse, the heart, the pain, the respiration; and I have no doubt, if a man will take a true, and a dispassionate view of the present and the future of the case, he shall, in the majority of instances, yea, as often as Gordon asserts, wrest the victim out of the hands of the destroyer. But he shall adopt no half measures. He shall not preach copious bleedings with Leake and Denman, and practise small ones like those gentlemen. He shall shut his eyes to the weakness, to the faintness, to the sinking, to the typhus, and open them to comprehend the real extent of an area of inflammation, which, if not incurably expanded, he may hope, or try to cure, but which, with Gordon, he abandons to the powers and resources of nature and Providence, when he deems it too great for his method.

Such are my views, not taken up at hap-hazard and carelessly, but pondered upon and acted upon for more than the third part of a century, in the midst of incessant clinical experiences. I shall never cease to advocate them, as I conceive them to be founded upon true principles in physiology and pathology.

Therefore, I say to the Student, if he have a patient in charge attacked with childbed fever in the peritoneal form, and if he can come to the bedside soon after the onset, the sooner the better, let him bleed if possible twenty-four ounces, or more, and not less. Let him say, if compelled to desist with the abstraction of twelve, or even fifteen ounces, "She is not safe!" but with twenty-four ounces or more, with an incipient and not too large area of phlogosis, "*She shall* be saved by the method."

In case No. 60, from Dr. Collins, on which I lately presented some remarks, that gentleman, as has been seen, repeated his venesection, and, in so doing, gave his patient the best chance that could have then been presented to her. I admire the boldness of his proceedings in that instance, and I should be happy, could I think the Student would hereafter imitate him in that resolute prosecution of the method. I, of all things, in this relation, most earnestly wish that he would apply the method timely or early; but if he should not arrive in time to do the operation early, it may yet not be too late to do it. There is a stage at which the method ought not, and will not be applied by any sensible man. When the inflammation, for example, is upon the point of ending in effusion, or when the effusion is already in progress, to bleed can do nothing but mischief. As a general rule, he will be obliged to follow Gordon, who, if twenty-four hours had elapsed, felt obliged to propose bloodletting, though he could make no promises of good from it. This rule of twenty-four hours is sound for the general, but is not so for every particular, for there is no ascertained ratio of progress; whence it might and will happen that a venesection may not be too late on the third day, or even on the fifth or seventh days. Such instances will, however, be rarely met with.

To show that weakness existing previous to the attack is no bar to the use of the method, I may say that I attended a lady here, during an epidemic prevalence of childbed fever, who had a hemorrhage before delivery, in which she lost no less than ninety ounces of blood, which left her pale and feeble. She was shortly afterwards assailed with puerperal peritonitis of a violent form. In that case, I bled the lady to the extent of bringing down the violence of the pulse, and thereby saved a life, which I am confident must have otherwise been lost. In my essay, introductory to the volume before mentioned, containing the works of Gordon Hey, &c., I stated a case of peritoneal childbed fever, in which I bled the patient in all sixty-five ounces, and with the happiest success. I do not believe that the extension of the area of phlogosis is in equal ratios in equal times; nor is the inflammation itself, whatever be its area, always moving to the culmination at a specific rate, like that of a variolous pustule. Hence the rule, not to bleed later than the twenty-fourth hour, cannot apply to all the cases; since, in some, the forty-eighth, seventy-second, or ninety-sixth hour finds the disorder less advanced than it usually is at the twenty-fourth hour.

Leeching.—Many persons who fear to use the lancet, have no hesitation to take away blood by leeches. It is doubtless true that, if the quantum of blood within the vessels be diminished, by whatsoever cause, the physiological conditions, relative to that diminution, must wait upon the abstraction. The question, then, as to the comparative usefulness of the two methods, whether by venesection or leeching, is one to be tried by a comparison of the advantages of them respectively. I cannot advise the Student to prefer the use of leeches, because I consider that mode of depletion less convenient, less exact, and therefore less manageable. In conducting the operation by venesection, there is no difficulty in stopping, in temporarily suspending, or in persevering, until, by the well-known signs in the pulse, or the physiognomical expression, respiration, hue, and statement of the patient, an opinion is accurately formed. Whereas, in leeching, we cannot stop instantly, nor judge accurately as to the quantity to be withdrawn. Some there are, who advocate the use of leeches on the ground that they take blood directly from the inflamed parts; but the younger Baudelocque has shown, in his beautiful prize essay on puerperal peritonitis, the fallacy of this notion. It is to the last degree improbable that the application of leeches to the abdomen can have any direct influence upon the inflamed capillaries of the mesenteric, mesocolic, or hepatic circulations.

I shall not presume to deny that leeching the abdomen may be a useful method for treating some forms or some stages of puerperal peritonitis. Nevertheless, I may aver that, within the bounds of my own experience, I have nothing favorable to say of it.

Cupping.—This is a method which is excessively inconvenient and inapposite to the cases. Women are, for the most part, attacked within seventy-two hours after delivery; and, at that period, the teguments of the belly are still too flaccid after their late distension to admit of the proper application of cupping glasses.

Emetics.—A singular instance is to be met with in our medical history, of the flattering delusion that follows the announcement of new remedies. At the session of the French Royal Society of Medicine, of September 6, 1782, a memoir was presented exhibiting the results of

M. Doulcet's new method of treating childbed fever. Dr. Doulcet was one day at the Hôtel Dieu, just as the first symptoms of a puerperal fever, then epidemic in that house, became manifest in a recently delivered woman. It commenced with vomiting. M. Doulcet, immediately seizing upon this indication, ordered fifteen grains of ipecacuanha, which the patient took in two doses. The doses were repeated on the following day. The medicine operated both as an emetic and as a cathartic, the evacuations being followed by a notable amelioration of all the symptoms. The dejections were promoted by the use of an oil-mixture with two grains of kermes, and the patient was saved.

Upon this good success, the chief midwife was instructed to watch for the very first symptoms in any future case, and immediately thereupon to proceed with the treatment as above, without giving time for the engorgement to become established. In fine, "Partout le succès fut le même; et en quatre mois, pendant lesquels l'épidémie regna avec fureur, près de deux cents femmes furent rendues à la vie;" "in all cases the success was similar, and, in the course of four months, during which the epidemic prevailed furiously, near two hundred women were restored to life; five or six only, who refused to swallow the emetic, fell victims to their obstinacy." The above is from the *Hist. de la Soc. Roy. de Méd.*, 1780 and 1781, p. 254.

All Europe was gladdened by Dr. Doulcet's wonderful good fortune, and he became at once famous, and but for his premature death shortly after this discovery, honors would have been heaped upon him. This method was tried everywhere, but everywhere in vain; and Dr. Fothergill, reporting upon the cases at the Royal Medical Society of London, hints that Doulcet's method might be by many regarded rather as preventive than curative. Was this a malicious hint?

Doulcet's method is gone clean out of fashion, and I do not suppose that physicians, as a body, anywhere rely, at the present day, upon fifteen grains of ipecac. and two grains of kermes as cures for childbed fever.

Prof. Moreau, while showing me some of his cases of childbed fever at the Maternité at Paris, in June, 1845, told me that, occasionally, they met with a form of the disorder that yielded favorably to Doulcet's method; but I gathered from his speech that such instances are "few and far between."

After what I have stated in the early part of this chapter, the Student will not expect me to advocate the use of emetics as a principal method. But there are, doubtless, not a few cases of the disease, which, beginning under circumstances of a saburral state, whether mucous or bilious, of the primæ viæ, might be greatly benefited by the happy operation of an emetic so gentle and safe. One can hardly undergo its operation without bursting into copious perspiration during the emesis. A disk of incipient peritonitis might receive a salutary check, and acquire a tendency to diminish instead of continuing to expand its area, under the new nervous excitement and sanguine determination provoked by the impression of this drug made on the nervous mass, and by the emulging and succussive efforts and shocks of the act of vomiting. I therefore advise the Student not to overlook the properties of ipecacuanha, while casting about for the best means of checking an attack just begun. It would be both useless and cruel to subject the woman to such shocks after the abdominal peritoneum has become extensively invaded. The pain would be frightful.

Cathartics.—I know that certain persons condemn the use of cathartics in our cases. But seeing that, in general, women go into labor with overcharged bowels, and that, among the earliest mischiefs in the cases, is the tympanitis that speedily comes on, I cannot doubt of the propriety, and even necessity, of prescribing cathartics at an early stage, and of repeating them judiciously, in a manner to compel the inflated and blown-up intestines to contract upon and expel the gases that are extricated within their cylinders. It is certain that I have seen instances rendered intractable by angulation of the gut, an accident that I described at page 649; and it cannot be denied that an extreme degree of tympanic distension does materially contravene the purposes of the respiration, by lessening the stroke of the diaphragm, and thus leading to a partial state of cynanosis, or asphyxiation, which augments with the progressive meteoration of the belly.

There is not to be found, perhaps, a more efficacious cathartic for the commencement of the treatment than calomel in a full dose. Few individuals can be met with for whom ten or fifteen grains of that drug will fail to operate, and it is desirable to have neither failure nor long procrastination of the effect. Hence, I advise the Student to exhibit, very soon after he has performed his Gordonian venesection, at least ten, and if the patient is of a good constitution, fifteen grains of calomel, which it is useful to combine with a grain, or two grains, of opium. To insure a complete catharsis, the woman should take, within two hours after the dose, half an ounce of castor oil. After waiting four or five hours for the operation of the calomel, or even sooner than that, provided the meteorismus begins to appear, she should have an enema of castile soap and water, or one containing an ounce of common salt, dissolved in a pint of warm water.

By this method, the peristaltic muscles may be compelled to contract with much force and for so long a time, as to discharge not only the residua of the digestions and saburral collections, but every cubic inch of those gases, whose accumulation and persistence within the intestinal tubes oppose the fortunate operation of all other remedies.

I believe that Chaussier's method is a good and safe one to be followed after these first operations, viz: The patient may take a table-spoonful of a mixture, composed of castor oil one ounce, with syrup of rhubarb two ounces, to be repeated *pro re natâ.* If such operations should be judiciously maintained, there will be increased abundance of secretions, whether gastric, bilious, or intestinal, the whole of which must be furnished by the capillary ramuli of the cœliac and the mesenteric arteries. But, as the visceral peritoneum derives its capillaries from those three great digestive trunks, it is easy to see that their circulation must be much relieved by copious mucous and bilious separations from the blood they convey in common with the vessels of the other coats of the bowel, and of the integral tissues of the other viscera of the belly. I shall not dwell further upon this subject here; but, before I lay it aside, I shall implore the Student not to confide the chances of his patient to such hopes alone. They are firm and good adjutors of the method—the method is venesection.

Stupings.—Stupings with very warm water, applied by means of flannels laid over the whole belly, lessen pain and incite to sweating. A patient will rarely fail to fall into perspiration soon after the application of warm stupes to the belly. But, as this process of stuping is troublesome, and as the binder cannot be conveniently used while it goes on, I prefer to get at the same result by means of very light, but hot cataplasms, such as thin mush of corn-meal or lint-seeds, mixed with hops, stewed to a proper pultaceous consistence; or chamomile; or tansy with fresh mint, combined with the emollient lint-seed or with rasped bark of the slippery-elm. This adjuvant should be resorted to very early, and persisted in until the resolution of the inflammation becomes sure.

Blisters.—I regard the woman under childbed fever as supporting a burden of irritations too great too be easily borne, and I will not add another so intolerable as this. I grant that women have recovered who were blistered, but do not now remember to have seen more than one such. The physician ought to repeat his diagnostications with every renewed visit to the bedside: to blister the belly is to put a veil betwixt his senses and the operations going on within the cavity; he cannot discriminate between the pain and soreness of the remedy and those of the disease. I, therefore, do not recommend blisters in childbed fever.

Oil of Turpentine.—A Dr. Brenan, of Dublin, awakened, about orty years ago, the highest hopes of the profession, as to a remedy or childbed fever, by the successful treatment of a few cases with doses of oil of turpentine, and the employment of it as an embrocation or the abdominal region. I shall not discuss the question as to the fficacy of oil of turpentine, nor the stage of the disorder in which it is most applicable. Dr. Meissner has given a learned *resumé* of the authorities, to which the curious Student may refer.

Opium.—These cases can hardly be well conducted without the aid of opium as a helper to the cure. I have already signified my approbation of the combination of it with calomel, and doubtless, when our chief evacuating methods shall have been once carried into effect, we shall be compelled, or rather we shall anxiously wish, to obtund the nervous impressionability by a moderate induction of the opium anæsthesia.

The drug may be exhibited in the form of Dover's powders, repeated in doses of three or five grains every hour or two, until the tranquillizing or soporific force of the drug is made manifest; but it will often be found both more useful and more convenient to exhibit the drug as laudanum or black drop, with small starch or mucilaginous enemata, especially when there are great pain and irritation within the pelvis or in the womb. Some persons have relied upon the exhibition of opium in very large doses, frequently repeated, as in delirium tremens. I do not believe such a method will be crowned with a general success.

Mercury.—It is thought that mercurials possess an aplastic power, as it is called; that is to say, they determine the evolution in lessening ratios of fibrine or plastic lymph in the blood. I do not regard this as more than an hypothesis; and it cannot be doubted that where stomatitis or ptyalism is produced by the drug, the evolution of fibrine is considerably increased instead of being lessened. It was formerly deemed desirable, at least by many, to procure an early salivation as a cure for the peritonitis. Hence, women have swallowed from three to nine hundred grains of calomel in the course of a few days, and many have been blistered upon the belly, with a view to get an exposed corpus-mucosum, on which with greater certainty of success to apply the salivating ointment of quicksilver. This appears to me to be a barbarity, and a useless one too, since I conceive that the woman who should recover with it would more readily recover without it.

Antimonials.—A sick person, who is brought under the condign influence of tartar emetic in fractional doses, will be found to have the systole somewhat lessened in force and frequency; but great caution is demanded in the just handling of the drug. If given in excess, it causes great distress from the nausea or from vomiting, and is likely to excite unfavorable relaxation of the bowels; nevertheless, in all inflammatory diseases, the preparations of antimony, judiciously administered, tend to the subduction of the vascular and nervous reaction of the economy against the topical lesions. I cannot advise the Student to trust his childbed fever cases to the sole power of antimonials, as therapeutical agents; but, after the evacuations have been duly premised, these medicines are, in my opinion, among the most indispensable of remedies.

My own clinical experience teaches me that, in using them, it is desirable to use them just *citra-nauseam*. If they provoke to positive nausea and disposition to vomit, they only add to the load of irritations already sufficiently intolerable. Hence, I am accustomed to use very small doses, as thirtieths or fiftieths of a grain, either dissolved in pure water, or in water along with a minute portion of morphia.

Such a prescription would prove unsuitable in those cases, not unfrequent ones, in which there is strong disposition to diarrhœa. Doulcet employed the kermes after his ipecacuanha doses, and the celebrated Chaussier was accustomed to rely much upon the same article after evacuations by the lancet and by cathartics.

Enemata.—It appears to me that enemata constitute a chief, and, indeed, indispensable part of the *armamentarium medicum* in these cases. One of the most striking phenomena of childbed fever is the meteoration, or tympanitis, that attends upon almost every case. It could not be expected that the serous coat of the alimentary canal should be greatly and extensively inflamed without producing its inevitable influence upon the muscular apparatus of the bowels, which refuse to contract beneath the sort of shirt of Nessus that wraps them in the fiery covering of an inflamed peritoneum.

I do not wish to discuss the question whether the gases that inflate and distend the bowels are secreted or extricated. Be the source of those gases what it may, their presence within the tube is a disastrous accident in many of the cases. I have observed women, attacked at four A. M., to be much more distended at ten in the forenoon than they were in the last days of the pregnancy; and the whole of this enormous distension arose from the presence of gases within the stomach and the great and small intestines. The belly, in some individuals, has been swollen as if it might burst, being perfectly elastic under pressure, and sonorous as a drum. Let the Student reflect upon the aggravation of distress that must exist under such a condition, and let him consider how vastly the superficies of inflammation is expanded by the expansion of the superficies of the bowel, and how great an advantage would be likely to result from any method by which the diameter of the intestine could be reduced to and maintained in its normal measures!

As to the colon, it is at least six feet in length. It occupies the cavity of the belly in common with the small intestines and the viscera. Should the whole colon—six feet in length—become larger than a stout man's arm, it is clear that its turns or convolutions can no longer be effected in curves; but the returns must be effected by acute angles, or angulation of the gut; such a distended tube, bent on itself at an acute angle—I have seen three such acute angular returns in one dead body—is equal in its obstructing power to a ligation of the bowel; nothing, not even gases, can pass beyond the point of angulation, and thus the miserable woman has a strictured gut to contend with in addition to all the other causes of destruction.

These remarks ought to show the Student, that, when alarmed by discovering the first small area of phlogosis, he should at once ponder upon the possible effects of the sure coming intestinal inflation. Cathartics, then, would be deemed indispensable, and the practice of Chaussier and others, who so solicitously attended to the due excitement of the muscular apparatus of the bowels, admirable. But we cannot venture to administer cathartics too frequently. Hence the value of the method by enemata. Clysters of aperient mixtures serve at least to compel the colon to discharge the gases that so dangerously distend it, and they should be repeated and reiterated according to the exigencies of the case. Enemata, composed of infusion of lint-seed mixed with castor oil, or of solutions of Spanish soap, or of mucilaginous fluids containing table-salt, or jalap, or extract of senna, procure the greatest relief, and add to the chances of cure. They fatigue the patient but little, and do not exhaust her strength. Sometimes enemata composed of an ounce of castor oil with half an ounce of oil of turpentine, made into an emulsion with mucilage or white of eggs and water, may procure the expulsion of gases that will not be brought away by any other compound.

For the childbed fever patient one invariable command should be insisted upon; I mean to say she should not leave the bed, nor sit up for the convenience of the evacuations; even the pillows should not be very high ones, for the patient is safest in a low recumbent position.

In the beginning, let the diet be absolute for twenty-four or thirty-six hours, and after that a light barley-water little sweetened, or rice water, or gum arabic water, with a cup of tea, or milk and water, equal parts of each with a morsel of bread.

I regard oatmeal gruel as detestable for such patients, as it invariably, even in women who are not attacked with any disorder, produces flatulency. So sure is this flatulency to arise, under a diet of oatmeal gruel, that I think I can venture to say few women use it in the first days of the lying-in without suffering more or less from the meteoration of the abdomen. In my *Letters on Women, &c.*, p. 595, I have quoted a passage from Rainald, on this very subject. The objection to "*ote mele cawdels*," which was so strongly urged in 1540, has been valid against that miserable but universal feed for the lying-in woman ever since that date. I protest against it. Gruel made of Indian meal, or fine South Carolina hominy, is totally free from such objections. A woman who is content to live for a few days on hominy gruel, with a portion of tea and toast, is unlikely to suffer from flatulent distension of the abdomen. Good cocoa, with milk and stale bread or toast, is a very proper and safe diet. As the disease advances, whey, chicken-water, beef-tea—but it is unnecessary for me to enumerate articles of diet for the advanced cases.

The Student will, I hope, learn to regard childbed fever as not a fever, but inflammation, and as inflammation commencing with small areas of phologsis in tissues prepared and prone to admit of frightfully rapid and destructive expansion of those areas. I do not mean to deny that, under the influence of extraordinary virulence of the epidemic cause, and in women predisposed by poverty, ill diet, terror, etc., the peritoneum may at once inflame in large patches. Indeed, some of the cases noticed by Dr. Collins, and some that I have witnessed, have led me to conclude that the phlogosis does rarely commence by a sudden erythema of the peritoneum, which, immediately passing into inflammation, causes the nervous mass to succumb at once under such multitudinous and insupportable irritations. So that the woman, if examined now, is well, and in an hour is found to be irrecoverably ill. These terrible cases admit of no treatment. Attempts to cure them seem only to aggravate the pains of the dying, and discredit both the physician and his art.

Nevertheless, childbed fever, even epidemic childbed fever, ought to be a tractable malady; and I am persuaded will be found so, provided the medical attendant should exercise a due vigilance at first, and afterwards a real intelligence and an undaunted resolution to carry out in practice the measures deduced from the pathology of the case.

I never doubt of Gordon's correctness on the subject of early treatment; but that early treatment must depend upon the vigilance of the physician himself. The vulgar notions on physic are not to be expected to put people upon guard against the earliest hardly disernible rudiments of a malady which requires only to be set on foot, to run a race so fleet as to defy all attempts to overtake and arrest it.

If Gordon is right in declaring that we shall save the patient if we begin early, let us resolve to begin earlier; let us take measures to insure the application of the *method*—there is but one method—as soon as the signal is given. If we can cure within the first eight hours, how much more may we confide in our powers if we begin with the very beginning! Wherefore, I let the Student watch—let him watch with a panoptical vigilance; and if the chill, the ague, and the pain—if the diagnostic say or even hint the area is formed, let him abstract such a quantity of blood as shall compel the heart to beat just as softly, and inject the vessels just as moderately as, in his judgment, he may wish or will it to do. He can limit in this manner the area of inflammation, and at the same time impress upon the inflamed tissue a tendency to recover by resolution, which is safety; and restrain it from terminating in effusion, which is death.

The cases of childbed fever, in which it assumes the form of metritis or uterine phlebitis, are different in character from those of the peritonitic form. The pain in the metritic cases, though severe, is more dull. It is confined within the pelvis, and does not develop the tympanitic disorder as in the other examples. In its earlier stages there is often exquisite pain, produced by spasmodic contractions of the muscular apparatus of the womb, in what is called after-pain. This is the reason why, in the commencement, we are sometimes greatly embarrassed by the question whether the attack be merely spasmodic, or whether it be metritic. I advise the Student to endeavor to settle this important doubt, for if it be after-pain, or rheumatism of the womb, it may safely be treated by the use of narcotics; whereas death must follow a mistaken diagnosis of after-pain or rheumatismus uteri, when, in fact, a pure phlogosis of the womb has begun its career. Let him, then, not only estimate the discharges, the place, the pain, the soreness, the breathing, the temperature, the pulse, and the physiognomical character at the time, but let him make the Touch, in order to have a clearer report from the organ itself—so that, if it be indeed a phlegmasia, he may bleed at once, and in a way effectually to fulfil the command, *Jugulare febrim.*

Uterine phlebitis rarely occurs alone, or uncomplicated with metroperitonitis. The inflamed state of a vein gives little or even no pain at first. It becomes a painful disorder only when the phlogosis has sunk below the true bloodvessel, or endangium, into the basement tissue on which the membrana vasorum rests. When thus inflammation has passed through the fibrous coat, and has attacked the cellular sheath in which the vessel is inclosed, then the pain becomes considerable, for it is a phlegmonous inflammation. Hence, uterine phlebitis is the most insidious of disorders, and has often attained to an incurable stage, before even the constitution of the woman takes the alarm, and begins to sink under it.

Whenever it shall have acquired a certain degree of intensity, and also begins to be pyogenic, and when corpuscles of pus, washed away from the veins by the torrent of the circulation, are transported to the heart, by which they are injected into all parts of the systemic circulation, this purulent infection of the blood manifests itself, not solely in the rate of the heart's action, which it greatly hurries, but especially by its influence upon the psychical state of the woman.

In pyæmia, we have the strangest hysteroid phenomena. Pus-corpuscles in the blood causes pyæmic intoxication. Indeed, one is apt to be grossly deceived; to believe he has in hand a case of hysteria or insanity; but, far from that, he is dealing with a mortal pyæmia, a state in which the blood is charged with pus-corpuscles that exercise an influence upon the nervous and psychical forces of the woman, closely resembling the effects of arsenic in poisoning doses.

I will not say that pyæmia from phlebitis shall kill; yet, certainly, I believe we cannot meet with diseases more unmanageable. We ought to arrest the malady *in inceptû*, by a Gordonian venesection; if we fail in success, then we must expect the death of the victim, or contend with a long and terrible malady, during which the economy painfully and slowly eliminates the purulent corpuscles, and at last restores the healthy crasis of the vitiated blood.

Pus, thus generated, and thus transported by the circulation, is collected again in the form of cold abscess, which may declare itself, in the course of a single night, or lay the foundation for the most painful and slow imposthume.

I have seen a patient under pyæmia go to sleep at night with her hand in perfect order, and awake in the morning with the whole space between the left thumb and forefinger filled and plump with the pus transported and deposited there in a few hours.

A lady here under my care was seven months ill, requiring daily visits. During that time, she deposited pus in eleven distinct abscesses, and did not recover her health or become wholly free from the pyæmia until a short time before she recovered her health.

In the conduct of our cases of childbed fever, we should endeavor to make a correct prognosis. It is always unfavorable if we commence the treatment more than twelve hours after the beginning. A violent assault, evincing its violence by great pain, ague, early meteorismus and tympany, rapid expansion of the seat of pain, pulse of 140 per minute, uneasy state of the stomach, altered physiognomical expression, great and early debility, and a presentiment of the patient that she will not recover, is highly unfavorable. On the contrary, a slow expansion of the seats of pain, pulse softened and diminished in frequency, the failure of the meteoration, warm and abundant diaphoresis, fair toleration of the venesection and medicines, a cheerful mind, lessening temperature, absence of rigors, moderate thirst, no eructations—these, proceeding from better to better, shall augur the success of our treatment.

But, inasmuch as I have already drawn out this chapter to a length far greater than I had intended, and as I have in a special treatise put forth my thought upon the nature, seats, causes, signs, and treatment of the malady, I shall now bring it to a close with the earnest recommendation to any Student who may honor it with a perusal, to purchase and carefully to read at least the volume on Puerperal Fever, published here by Messrs. Barrington and Haswell, and which contains not only the precious work of Gordon, but the impayable treatises of Hey the younger, Drs. Armstrong and Robert Lee. Let him read at least these, if not mine, and as many others as he can lay his hand upon.

Before closing this chapter, I beg leave to refer again to what I said in regard to the action of the epidemic cause upon the nervous mass of animals. The more I reflect upon the nature of animals, the more do I become convinced that all impressions from without or from within are made upon that part of our animal substance that is called nervous substance. I have been very much surprised by an expression of Prochaska, at p. 387, *Prin. of Phys.*, published by the Sydenham Soc., who says "that a nervous system is not present in all animals," &c. &c. It is hardly true that many insects have not cerebra; and though infusory animals are destitute of brain and nerves, it does not follow that they are deprived of, or could exist without a nervous substance. The first of physiologists, Oken, has clearly shown that, even in creatures who are destitute of brain or nervous tractus, there is distributed everywhere in their material, a portion of nerve substance, that serves as the animating principle of all the rest of their material or substance. It seems to me that no person could follow him in his exposition of the psychical homologies of animals, rising from the lowest grade to the highest eminence in the zoological series, without becoming convinced that, even in creatures unprovided with what might be called a nervous system, there is for them abundant provision of nervous mass which, in my view of it, is the very essence of animality. Changes effected in the crasis or perfection of this nervous mass may well account for the symptoms developed by *epidemic cause.*

CHAPTER XX.

OF ATRESIA VAGINÆ.

THE obstetric physician will be likely, in a long career of practice, to encounter cases of atresia of the genital organs.

Some of the cases are capable of giving rise to extreme distress, and even of bringing the life of the patient into danger.

Atresia, or closure, or obturation of the vagina or cervix uteri, may occur as a congenital malformation, or it may take place in infancy or childhood, and may even occur in persons who have borne children.

The obturation may be discovered to exist in any part of the canal of the vagina, whether at the vulva or whether at the uterine extremity, or whether midway of the tractus of the tube.

In the congenital cases, there may have been fault of development, the mucous tissue having totally failed to be constructed. In infants or young children, a slight vaginitis might suffice to determine the cohesion of the opposite walls of the vagina, the occurrence remaining undiscovered until a full puberty, or the state of marriage, should lead to the disclosure of the fact.

To show that it may occur in women who have borne children, I refer the Student to the following case:—

CASE.—A woman, from a distant part of the country, came to the city, in the spring of 1837, in order to consult Dr. Randolph, who was good enough to invite me to see the patient with him. Her story was as follows. More than two years have elapsed since she gave birth to a healthy child; the labor was extremely rapid, so much so, indeed, that the infant was born before the physician could reach the house. The after-birth did not come away for an hour, during which time there was flooding. It was at length removed by force. The woman became very weak. In a few days she was attacked with inflammation of the vagina, accompanied with enormous discharges of matter, and "great thick pieces of flesh," to use her own account. She was never examined by her physician, who, however, directed washes, injections, &c. After a long and exhausting hectic, attended with extreme emaciation, her discharges grew less copious, and she gradually, at the end of some months, got well. There was, however, no vagina, not even a *cul-de-sac;* there was simply the genital fissure. Of course, no catamenia could appear; but, after several months of good health, she began to complain of pain or *misery* in the hypogastric and pelvic regions. The pains recurred with periods of a month, and having at length become intolerable and persistent, she found her health declining, and came, as before said, to consult that able and eminent surgeon, Dr. Randolph.

There was a tumor in the hypogastrium, which reached half-way up to the navel; it was of a firm and resisting feel, not unlike a contracted womb soon after delivered. As there was no vagina, the finger was passed into the rectum, where it came in contact with the same tumor, which seemed to occupy the excavation as it is occupied by a child's head, filling the cavity entirely. Upon separating the labia, there was nothing but the genital fissure; there was no way for a common probe to pass upwards. A sound was introduced into the bladder, and retained there until a finger was also introduced into the rectum: the only texture that separated the finger and the sound seemed to be, upon careful examination, the walls of the urethra and the coat of the bowel; there was no vagina to be felt. Hence Dr. Randolph and I agreed in opinion that the vagina had been wholly destroyed by the sloughing process which took place shortly after her confinement. We entertained no doubt as to the nature of the tumor that occupied the pelvis and lower part of the abdomen: it was the womb hermetically sealed, and retaining in its cavity the accumulated menstruations of nearly two entire years.

After much diligent search, we were unable to discover the cervix, or os uteri; but we supposed it might possibly be turned upwards towards the top of the pubis, so as to elude any investigation made through the rectum alone, the only possible way of making research. No vestige of a vagina was discoverable by the taxis; nevertheless, supposing it possible that the whole tube might not have been destroyed, and that haply its upper extremity might be reached by the bistoury, Dr. Randolph operated with a view to make an artificial vagina, and discover the remainder, if any, of the original one.

Introducing a strong metallic staff, slightly curved, into the bladder, he took his seat in front of the patient, who lay on her back, with the knees drawn up and separated. I held the staff firmly, while, with the forefinger of his left hand in the rectum to serve as a guide, by horizontal strokes of the bistoury he dissected the tissues betwixt the rectum and urethra, and carried his incisions up very nearly to the substance of the womb itself, without having wounded either the rectum or the urethra: when he had completed his incisions, the whole finger could be passed upwards to the bottom of the *cul-de-sac* he had formed by so skilful and accurate a use of the bistoury.

In consequence of our uncertainty relative to the situation of the os uteri, and from his having successfully removed so considerable a portion of the barrier which opposed the escape of the contents of the uterus, Dr. R. suspended his operation at this point, with the following views:—

It was resolved to keep the passage open by the use of a bougie, made as light as possible, and of a size sufficiently large. The bougie was made of silver gilt, about four inches in length, and as large as the thumb, its weight not more than two drachms, being hollow. We indulged a hope that, by using this bougie a few months, the progress of the case would be such as to bring the os uteri to the extremity of the instrument, by means of the increasing expansion of the uterine globe, and that the contents of the womb would discharge themselves into the artificial vagina, or that they might be discharged by a future incision. The lady returned to her own country, and after an absence of three months came back to the city, still suffering under the same misery, with an increased magnitude of the uterus, but without having had any discharge from the vagina. She had constantly worn the bougie. Upon examination, we found that the new vagina was now covered by a smooth surface, resembling a mucous membrane; the upper end of the bougie, when withdrawn, was covered with a sort of muco-purulent matter, tinged with blood. The sufferings of the patient from the distension of the womb were very great, and it was on that account agreed to puncture the organ in order to draw off its contents. On the eighth day of July, 1837, Dr. Randolph and Dr. R. M. Huston, who had been invited by us to witness the operation, met me at the lodgings of the patient.

The tumor, felt through the vagina, was hard and resisting, like an enlarged ovarium; it was softer and the walls thinner, when examined through the rectum. At Dr. Randolph's request, I now made use of a curved trocar, inclosed in a canula, in order to puncture the womb. The trocar was about five inches in length, and of the size of a small writing-quill. The patient was laid on her back near the edge of the bed; I introduced the forefinger of the left hand into the rectum, and, having directed the end of that finger to a part of the tumor that felt most yielding, I carried the point of the trocar along it, and having given it a direction as nearly as possible perpendicular to the surface of the tumor, pushed it through the resisting tissue until I found it had freely entered the cavity of the uterus; the trocar was now withdrawn, leaving the canula in place. There issued from the open end of the tube a dark-red viscous material, without odor, of the consistence of meconium, and as adhesive as that substance. The puncture was scarcely felt. In twenty-four hours, during which the canula was permitted to remain *in sitû*, properly secured, about twenty-five ounces of this fluid were discharged: the uterine tumor had disappeared from the hypogastrium, and the mass, as felt in the rectum, was greatly reduced in size, and far more movable. As all the liquid seemed to be now evacuated, the canula was withdrawn; no discharge followed its withdrawal. The patient had no symptoms attributable to the puncture. She rapidly recovered her strength, and left the city with renovated health, and nearly free from the misery which had so long embittered her existence. In the course of about a month after returning to her home, she had a very copious discharge, from the vagina, of a fluid of a consistence similar to that which had flowed through the canula, but of a whitish color, after which her health greatly improved. On Tuesday, the 12th of December, 1837, the patient, while on her way to the city, for the purpose of further advice, discharged from the vagina about twenty-five ounces of a substance in all respects similar to that which passed off when I used the trocar to puncture the womb. I was informed, in 1841, that she has menstruated regularly, and has recovered a very comfortable health.

I refer to the ninth letter, page 83, of my *Letters to the Class*, for a fuller account of cases of obstruction of the vagina, than it would be possible for me to introduce into the present work.

Before I close this article, however, I shall take occasion to mention that a careless inspection of the surfaces of the bottom of the vulva might, in some instances, mislead the practitioner as to the existence of an atresia. A lady, already four months married, was presented to me for examination on account of incapability of consummating the marriage rite. Upon inspecting the surfaces, I found in the usual place, at the bottom of the vestibulum, to wit—what I supposed to be the orifice of the urethra; while the tissue, falling downwards and backwards within the genital fissure, seemed to be the anterior wall of the vagina, which had cohered with the posterior wall. The apparent fossa navicularis was shallow, and, upon stretching it downwards, some appearances of a raphe of cohesion were discovered, extending in a semi-circular direction nearly up to the supposed orifice of the urethra. In order to relieve the patient, I made some slight incisions into the supposed raphe, thinking thereby to destroy adhesions and make an opening into the vagina. But, owing to the extreme restlessness and agitation of the patient, it was impossible to proceed with the proposed operation. On a subsequent occasion, it was ascertained that the supposed orifice of the urethra was the natural opening at the top of the hymen, which was a very dense, fleshy membrane, an eighth of an inch in thickness. The true orifice of the urethra was afterwards found concealed in a small fold just above this aperture. It was proved to be the urethra by passing a catheter through it into the bladder, while the inferior aperture, scarcely larger, permitted the introduction of the catheter into the vagina. The hymen was destroyed by a stroke of the scissors, and the vagina, an exceedingly narrow one, was subsequently dilated with the gilt bougie.

I have never seen so deceptive a case, and I cite it here in order to put the Student upon his guard against the mistake which I committed.

CHAPTER XXI.

ON ERGOT.

I AM inclined to say a few words as to my opinions upon the secale cornutum as a therapeutical agent of great power in labors. It is needless for me to say anything here as to the nature of this substance, which is fully described in a book universally in the hands of the physicians of this country: I mean, *Wood and Bache's Dispensatory.* There is also a very full account of it in Cazeaux's new work, *Traité Théorique et Pratique de l'Art des Accouchemens*, commencing at p. 395. I have had occasion many times to witness, during a long-continued practice of Midwifery, the effects of the secale, whether administered with my own hands or by those of others. It has frequently been the subject of conversation among my medical brethren here; and I feel very much persuaded that the general opinion of those gentlemen is one that may be stated as distrustful of the ergot, not as to its want of power, but as to the dangerous nature of that power, whether as regards the woman or the child she is bearing.

The late professor, Dr. James, was perhaps less fearful of its mischievous qualities than Dr. Dewees; the former resorting to it not unfrequently when a failure of power existed, and the latter always presenting against its use the most careful array of objections, except under circumstances pointed out in his Midwifery.

Those who have perused the little volume published a few years ago by a Dr. Mitchell, an English practitioner, who writes in favor of the use of ergot, will feel surprised to witness the audacity with which one person exhibits it at the very onset of labor, or as a preparative or aid in turning, etc., and the extreme precaution recommended by Dr. Dewees, who never sanctions its use as an aid to expulsion, unless the os uteri should be fully dilated, and the child already pressing out the perineum.

Within a few years a good many persons continued to doubt whether the article really possesses the singular and positive quality of exciting the contractions of the womb. I have not lately heard of any objections to it on that score; but they rather arise from the uncontrollable force which it awakens in the womb, leading, as is supposed, to danger of lacerating the organ when the resistance to its expulsive effort is too great, and very commonly to the death of the child.

It is true that I have known laceration of the womb follow the exhibition of ergot, and have on occasions stood by with fear, and expected that horrible result. This is a rare event, however; whereas the death of the fœtus from the rash exhibition of the medicine is a common one, which is reasonably to be looked for, and for the reasons which I am about to state.

In the case of a feeble and attenuated patient, with relaxed and we issues, whose labor is lingering merely from want of power, and 1 rom unnatural resistance, I can imagine that the ergot might be administered at almost any stage of the labor. But in a woman d health, whose labor is slow for want of proper rotation of the r rendered lingering by rigidity of the os uteri, vagina, or peri- or vulva, or from excessive relative magnitude of the head, the st consideration should ever, before resorting to the ergot, be n to the whole case in order to decide which is preferable, the or forceps or vectis.

child so situated or so large that an enormous force is required for its expulsion, and that antecedently to that expulsion some changes ought to take place in the direction of the vertex, &c.; no prudent practitioner would blindly urge his patient to destruction by giving her ergot, without first changing the direction of the head to the required position; and if the soft parts should oppose, by an excessive rigidity, the birth of the child, he would, by the use of the lancet and warm bath, or by stuping the parts, &c., make some preparation for the exertion of the terrific energies of the medicine. Let us think for a moment upon it. A labor is effected by the contraction of the muscular fibres of the womb, aided by that of the abdominal muscles. If all the power employed in a labor could be accumulated in one single pain, lasting as long as all the natural pains do, few women probably could escape with life from so protracted an agony, except that small number who are met with, and whose organs, happily for them, make no resistance, but open spontaneously like a door to let the fœtus pass out.

Now the influence of ergot in a full dose is such that it excites in the fibres of the womb a contraction or tonic spasm which is called ergotism, and which, when once begun, does not cease until the child is expelled, or until the organ has parted with all its irritability, and the spasm ceases from sheer exhaustion of power.

This contraction is so great, in some cases, as to split or lacerate the womb on the projecting parts of the child, or, what is more likely, to tear off the connection between the vagina and uterus, so as to force the child through the rent into the belly. Such a pain may last twenty minutes or even half an hour, without a moment's suspension. Imagine the feelings of the woman.

By a beneficent law of the economy, the pains of a labor are short, not lasting more than thirty or forty seconds in general, and returning once in three or six minutes. Under such pains or contractions, however powerful, the fœtus is safe; for, as soon as the contraction is over, it lies in the womb free from pressure; and the placenta, which during the contraction, had been violently compressed betwixt the womb on which it lies and the child within the cavity—the placenta, I say, recovers its circulation, and continues, during the absence of the pain, to perform all the branchial offices which belong to it. But, if an ergotic pain is produced, to last thirty minutes, in a case where the placenta seated on the fundus uteri is to be jammed for thirty minutes against the child's breech, without an instant of relaxation, who can doubt that its circulation is either wholly or nearly abolished, and that, when the child emerges at last from the mother's womb, it will emerge quite dead, or in a profound asphyxia, caused by the long suppression of its placental circulation? Multitudes of children are born dead from this very cause, viz., the imprudent exhibition of a medicine which as certainly excites spasm of the womb in labor as nux vomica does of the other muscles of the body.

What I want the Student to reflect on is this. Shall I in this case give a dose of ergot which will excite a spasm of the womb, hoping that the spasm will bring the child into the world? Is the child ready—is its head through the os—has its head undergone the rotation—is the vertex under the arch of the pubis—is the external organ in a dilatable state—in short, is there anything here that could prevent the child from emerging at once, if the whole of the contractile fibres of the womb could be thrown into a strong spasmodic action? No! Then the ergot may be given; for, if the child begins to move as soon as the womb begins to move, it will be born soon, and escape the asphyxia which would certainly overtake it were it to remain inside of the body, while a long ergotism should be exhausted in vain. The power of the ergot is exerted upon the whole muscularity of the uterus, the contractions that take place under the influence of ergotism affecting the fibres of the cervix as truly as they do those of the corpus and fundus; the question then recurs, shall I give ergot in this case, the cone of the cervix being still unconverted into a wide cylinder, in order to produce violent contractions of the fundus , not doubt ng at all that the whole of the cervix will be thrown smodic or ergotical contraction, but confiding in the superior f reater mass of muscular material contained in the tur ?

l's cases show that when he administered ergot in the undilated ning an unbroken ovum, the superior power of the fundus ly rap ly overcame even the ergotism of the cervix, and many his patients appeared to have escaped well from the rude trials to he exposed them. There would certainly be less danger in nistering ergot in a case where the ovum is unruptured, than in ich the waters ha dy expelled, since the uterus, case, could by no itself upon the anfractuosities he ch 's body and fata the after-birth. The practi- ner who should dare to d overed head of a fœtus against cervix in spasm by means of the mad force of ergotism, is, to least, a most u h ctitioner; one who recklessly his patient to the u terine lacerations, indifferent curity of the child, a oignant distress which cannot result from such an administra .

ny own part, I can sa rely give ergot as an expulsive I chiefly employ it at the moment of, or just before the birth of the child, in order to secure, if possible, a permanent or tonic contraction of the womb after labor, in women who are known in their preceding labors to have been subject to alarming hemorrhage. Of this I have before spoken in this work, and shall take occasion to speak further of it hereafter.

Upon the whole, I must say that I feel far more comfortable, and freer from apprehensions for the child and the mother, when I deliver with the forceps, than in waiting for the result of a dose of secale cornutum.

The medicine may be given in doses of twenty or thirty grains of the powder, mixed in half a cupful of hot water; or half a drachm may be mixed in six spoonfuls of water, of which one may be given every ten minutes. I think, however, that, when one resolves upon using the article in order to hasten delivery, it is best to give at once a good dose of twenty or thirty grains.

A forceps ought to be at hand. In some cases, when the ergotism is produced, not the smallest tendency to expulsion appears, but the child is held still, under a firm and equable pressure exerted upon all the parts of it still retained in utero. It would die very soon if not released. Hence, I said a forceps ought to be at hand, to save it, if possible, from the fatal grasp of the infuriated organ.

The use of ergot has very much diminished in Philadelphia in the course of the last ten or fifteen years. Few practitioners, when I was first engaged in business in this metropolis, were unprovided with a portion of ergot, which was given in almost every case of slow labor; the number of stillborn children, I doubt not, was greatly increased by this pernicious practice. At the present day, I think, it is rare for the practitioner to carry portions of ergot about his person.

I advise the Student of Medicine to be provided with a sufficient quantity of secale cornutum for any case in which he is made aware of a constitutional tendency of the patient to faintness and flooding after delivery. I think that no woman, who is known to have a tendency to flood dangerously after the birth of the child, should be left without its conservative influences. To give ergot some three or ten minutes before the child is born, is certainly not to expose it to the least danger from the ergotism, for it is extremely rare to observe the therapeutical force of the remedy until from twenty to thirty minutes have elapsed after its exhibition: now, women who flood after delivery rarely do so within the first twenty minutes, and, as the power of the article extends to the vacant uterus, and is perhaps no less forceful there than in the gravid womb, a well-timed administration of the drug is almost invariably successful in obviating the tendency to hemorrhage. It is true that I have exhibited the secale in some instances at the very close of the labor for women whom I had known to flood dangerously before, and in whom no good effect was produced; but it is still quite true that, in the vast majority of instances, and they are very numerous, in which I have made use of this precaution, my patients have been preserved from the alarm, and the exhaustion, and probable danger to which I have deemed them exposed; so that, in fine, I have no conviction stronger than this, namely, that the late administration of ergot for hemorrhagic patients is salutary and needful.

I trust that no reader of this work will ever commit the imprudence of administering secale cornutum with the view to force a child through a too narrow pelvis. I have said already enough, perhaps, as to the necessity of ascertaining beforehand the amount of probable resistance to a successful ergotism, to guard him against so gross a malapraxis. I am painfully aware of several examples of fatal rupture of the womb brought on by the furious excitement of ergotism, generated in order to overcome the resistance of a contracted pelvis.

As to the influence of the ergot on the constitution of the female, I am entirely unaware of any poisonous power that it can exert when given in moderate doses. I have seen a few women affected with slight vomiting after its exhibition, but was unable clearly to trace the accident as an effect to the medicine.

It appears to me that its sole therapeutic force is exerted in stimulating the muscular activity of the uterus.

It is sometimes given for the purpose of procuring abortion; but for the most part, happily for humanity, in vain. There are to be met with inside of the professional pale, here and there, wretches who, not like Shiphrah and Phua of old, will consent to destroy the fruit of the womb. Those good women preserved the children of the Jews, notwithstanding the command of Pharaoh. The modern Christian assassins will for a small fee sometimes agree to put out of the way the child, whose wicked parents circumvent its death.

It is useful to exhibit ergot for the purpose of rousing the torpid muscular force of the uterus for the expulsion of hydatids, and of the dead ovum or mola; I have succeeded in this administration of it. It is highly useful in the hemorrhage of abortions, often provoking a speedier expulsion of the remains of the ovum; and, when that effect fails, it succeeds in arresting the hemorrhagic molimen by its power of condensing the uterus; of which a philosophical rationale is found in its ability to diminish the hyperæmia of the uterine circulation. In a gravid womb, the vessels are everywhere surrounded by the muscular tissue of the organ: when those fibres act fully, they cannot but compress the veins and arteries, so that we might metaphorically say that every vessel is surrounded by an animal ligature consisting of muscular fibre, which will tie the bleeding vessel if it be allowed to do so; and it will always do so, if we should allow it, by taking away the ovum, the waters, the child, the secundine, the clot, or the tampon.

To show that ergot may be taken in large quantities without injury to the health of the patient, and at the same time without exciting in the least degree the contractility of the child-bearing organ, I shall lay before the reader the following case, that of Mrs. R., at the 82d page of the 2d edition of *Clinical Midwifery*, by Dr. Lee.

"[CASE 29.] Mrs. R. again became pregnant about the end of December, 1837. 'On the 17th January, the catamenia not having appeared, she began taking secale cornutum for the purpose of producing the expulsion of the ovum.' She began by taking twelve grains four times a day in infusion. This having produced no effect in six days, the dose was increased to fifteen grains four times a day. In six days more, this was increased to a scruple four times a day. In six days more, this was increased to twenty-five grains without any effect. The dose was then increased to half a drachm four times a day. Mrs. R. then left off ergot for one week. When she again resumed it, she took one-drachm doses four times a day for four days, and this having produced no effect whatever, she left off taking it altogether. Mrs. R. therefore took seven ounces of ergot of rye, which was all procured at Butler's, Covent Garden. Labor not having followed, I perforated the membranes," &c. &c.

CHAPTER XXII.

OF MILK-FEVER.

THE mammary glands, which in the virgin state are small and to a great degree undeveloped, participate in the new movements of the constitution that are established in the pregnant woman. The tissue of the glands begins early to expand, and the breasts become sensibly larger very soon after the conception takes place; the areola and nipple assume a darker hue, and indeed turn almost black in some persons. These changes do not take place without producing a sense of soreness or aching of the part. So great is the increase of vital force, that some women find a considerable secretion of milk in the breast, as early as the sixth, seventh, and eighth months; but, for the most part, no milk is formed so soon. If a healthy woman should miscarry at five months and a half, it is to be expected that her breast will fill with milk within seventy or eighty hours after her delivery, and, *à fortiori*, secretion may be expected if she be confined at the sixth month or later. I have seen a woman whose child was born at five months and a half, who served as a most excellent wet-nurse. I have found milk in the galactophorous tubes of a young woman, whose body was exhumed for examination by a jury, although she had been confined at a little past five months. During all this time, the organ, though more firm and protuberant than in the non-gravid state, does not become positively hard, but is soft and yielding under pressure; for the increased size is owing more to an increased deposit of adipose matter on the breast exterior to the fascia of the gland, than to the swelling, enlargement, or engorgement of the glandular tissue itself, at this early stage. Such are the phenomena relative to the breast in pregnancy.

Let us now endeavor to account for them, by a reference to the internal structure and uses of the apparatus which nature has arranged for the support of the new-born product of the gestation.

The breast appears at an early stage of the fœtal existence, but does not become prominent until the period when the girl is passing into the womanly state, and even then the substance of the gland is more solid and condensed than when prepared for the production of milk. The adipose structure is very abundant upon the breasts, so that, in general, fat women have them of great size, without at the same time having a larger share of the glandular material than some other women of a meagre constitution; and, indeed, it does not appear that the largest breast is to be depended upon for the production of the greatest quantity of milk. A breast of middling size is to be preferred in choosing a wet-nurse.

A layer of adipose matter is to be found immediately under the skin in dissecting the breast, and this adeps exists there in masses or lumps, separated from each other by cellular digitations, which unite the skin to the parts beneath it. Underneath the fatty layer are to be found the lactiferous glands inclosed in their true fascia. The whole gland is so formed as to resemble somewhat a placenta, being circular, thinner at the margin than at the centre, and consisting essentially in a great number of small grains, the size of millet-seeds, which are inclosed in separate packets or bunches by the cellular laminæ, which thus break it up into lobes or nodules, each, as it were, inclosed in a cellular fascia. The exterior surface of the whole gland is inclosed in a condensed cellular texture, which constitutes a fascia for it, but is far more ductile or distensible than the fascial coverings of some other parts of the body. The gland thus constructed is supplied with blood from the intercostals, the external mammary, and the internal mammary arteries. The nerves of the breast are also derived from the intercostals and from branches that proceed from the axillary plexus.

It has also an abundant supply of absorbents. The granules of the breast, or its acini, give out, each of them, a tube or lactiferous duct, which uniting with others from the same bunch or packet of grains, at length form a lactiferous duct which proceeds towards the areola and nipple, so that each packet or nodule of acini sends its own excretory tube to the nipple, and has no connection with the circumjacent nodule. In the same manner the lobuli of the placenta send, each of them, its vessels towards the cord without communicating with the adjacent lobules.

The lactiferous ducts soon become, by the union of so many primitive excretory tubes, quite large reservoirs; and they become the larger, the nearer they approach the areola and nipple, within which they contract or grow narrower: each tube sends its own duct to the nipple, on the extremity of which it opens, in order to pour its fluid into the infant's mouth, when it is drawn forth by the suction.

It is stated by Haller, in his great work, and confirmed by other and later writers, that, in addition to the lactiferous tubes, which may e regarded as the efferent ducts of the acini and the packets, the actophorous vessels are also composed of numerous excretory or efferent ducts, which take their origin from the adipose cells, and convey thence a material that helps to make up the constitution of the milk. I do not know that this question has been settled by any of the minute anatomists in America or elsewhere.

The number of tubes opening on the extremity of the nipple amounts to fifteen or twenty, and each tube is lined, according to the opinion of Bichât, with a mucous membrane, since, he says, the orifices of all the glands are furnished with a mucous surface.

Such being the construction of the mammary gland, it follows that its nervous and vascular appara aving extensive communication the rest of the system, mus it with the faculty of awakening umerous and powerful in its diseased affections.

woman who approaches the t rm of her gestation feels the sts grow quite heavy; t her firmer in consistence; the la becomes blacker and bl she approaches her accouchement. After the child is born, bserves no change in them until the second, or more commonly d day, so that, until forty-eight or seventy-two hours have el e have no reason to look for any fluxional movement in that direction. But about this time the breasts commence swelling; they ache, and suffer shooting pains throughout their substance; the swelling goes on until the skin of the mamma fairly shines with the tension; blue veins, that are very broad, are seen creeping in every direction over the superficies of the hemisphere, and even the nipple partakes of the engorgement. The breast is now painful to the touch, and each one stands out so firmly and so hard from the thorax that the woman is often obliged to lie upon the back for more than an entire day, being unable to bring her arms together on account of the pain the breasts would suffer from their approximation.

In this state, the breasts may be compared to two great phlegmons upon the most sensitive part of the body, and we need feel no surprise at finding such a state of the glands accompanied with rigors and fever, and even violent fever. Accordingly, it is very generally the fact that a woman does not get her milk without, at the same time, getting a fever with it, and this fever is called the milk-fever.

I have, however, not the least doubt that on various occasions I have observed the beginnings of a fever, which proved to be the milk-fever, in which, during many hours, not the least appearance of increased engorgement, heat or painfulness of the breast was discoverable, signs which soon afterwards manifested themselves, and which, together with the usual termination of the fever in copious perspirations, after the usual course of nineteen or twenty hours, left no doubt upon my mind that the fever was milk-fever.

In a good moiety of the cases, this, like other kinds of ephemeral fever, is ushered in with rigors, headache, and pains in the back and limbs. These pains are often intense; but the true type of the fever is that of an ephemera which declines after a short and violent hot stage, that gives place to a copious sour perspiration.

If not before, then as soon as the milk-fever begins, the patient ought to take some aperient medicine, such as castor oil, salts, Seidlitz powders, or salts and magnesia. It is always cooling and calming for a feverish patient to have the bowels moved freely, and in this particular fever it is highly commendable to be watchful against any excess of violence in the febrile excitement. For my own part, when I find in a milk-fever that the pulses are strong and large and frequent, the calorific functions highly excited, and the head and back and limbs aching, I rarely fail to let blood from the arm. This is the surest and most prompt method of relieving the present distress, and by far the most certain means of obviating the dangers which accompany all fevers in a newly-delivered woman.

As I have said above, it is the nature of the fever to be ephemeral; yet it but too often happens that this ephemera is converted into a long-continued fever or a remittent, during the course of which various organs, and particularly the peritoneum and the womb, are excessively liable to be attacked.

To take eight or ten ounces of blood, then, and to give a smart purge, is a very safe and commendable proceeding in all cases of milk-fever that are a little severe.

I had, not long since, a young lady under my care in her first lying-in. The labor was very painful, and lasted about twenty-four hours. On the third day, she had a rigor, heat, swelled and painful breasts, and a great quantity of milk. Instead of going off in eighteen hours, this fever lasted nine days, when there was a complete solutio morbi. I supposed her to be now well; but no—she was attacked next day with all the symptoms of endocarditis, from which she barely escaped with her life. As the endocarditis went down, it was followed by a couple of very large and painful swellings, one over each sacro-iliac junction, both of which seemed to be doomed inevitably to suppuration. During the existence of these swellings, she had constant hectic; but both of them were slowly and with difficulty discussed, after which she regained her health most perfectly, having lost her milk. For several days the friends of this lady despaired of her cure, and she suffered the most distressing pains and weakness. Now, I have related this case to show what may become of the most simple form of milk-fever, and the necessity of observing it, not so much on its own account as on account of the conversions and depravations to which it is liable.

I think that one of the fruits of the statistical methods which have become fashionable of late years is the establishment of what, perhaps, might be properly called pathological Ontology. It seems to me that the tendency of modern writings is to make the Student and early practitioner believe that each disease is one and the same, saving the modifications that occur in *its* phases, from beginning to end. I presume, however, there are few practitioners who, from age and much clinical experience, have become familiar with the changes that take place in the diseased constitution, who are not aware of what has been called by a writer the "conversion of disease."

A disease may begin in the alimentary apparatus, and end as a disease of the respiratory apparatus; a curable disease of the brain may, during its existence, introduce modification of the health of the respiratory organs, which being curable, nevertheless, during its existence, brings about maladies affecting the kidneys, the spleen, the liver, or other noble parts of the body. It is difficult for me to conceive of a person dying of a single disease, for I firmly believe that life consists in the trinity of powers residing in the circulatory, oxygenating, and innervating organs; I am not surprised, therefore, to find a patient, who being seized with a rigor, the consequence of an overloaded or irritated mammary gland, is subsequently attacked with inflammation of the broad ligaments, uterine veins, or peritoneum, in consequence of the increased simple momentum of the blood, and modifications of the nervous force dependent upon the febrile condition. I need say nothing as to the changes in the crasis, or the mixt, of the blood itself, effected by the violent threshing force of the ventricles and the impetuous rush of that fluid through the arteries and capillaries of the body.

When, therefore, I find a lying-in woman with a synochus-fortis pulse, notwithstanding I regard a state of the mammary gland as the cause of the phenomenon, I tremble lest the force of the circulation should overcome the feeble barriers which the physiological condition of the fatigued and exhausted child-bearing organs offers against its violence.

I, therefore, make haste to reduce the violence of milk-fever within safe limits, by employing the only sure and the most effectual of all therapeutic resources against it, to wit, a venesection.

I deem it advisable to say here that, whereas the practitioner occasionally meets with seasons in which the constitution of the air highly favors the occurrence of childbed fevers, he ought, as soon as he discovers such a propensity among his lying-in patients, to put not only the nurses who may be under his guidance, but also some of the responsible members of the family, upon their guard, in order that the very earliest intimations may be given to him of the attack of milk-fever. This is rendered necessary by the circumstance that milk-fever begins with intense rigors, and even with shaking ague, in many cases; and that it ought always to be regarded as uncertain, for puerperal women, where the blow may fall whose first signal is a chill. It may fall safely and harmless on the gland of the mamma; or it may descend with irresistible and destructive violence on the veins of the womb or its muscular structure; or it may light up a broad and raging flame of inflammation in the whole peritoneal membrane. How needful is such a precaution, in view of the exigent demand for a bold, prompt, and liberal use of the lancet!

When the breast is filled with milk to distension, the whole organ becomes heated, and of an increased sensibility. This excitement, of course, extends to the areola and the nipple. This last-mentioned organ is also subject to be contused by the action of the child's gums, betwixt which it is pressed with considerable force: besides this, the suction power of the infant's mouth, equal to a weak cupping operation, attracts into its vessels a great quantity of blood, which, by frequent repetition of the suctions, establishes at last an engorgement, and even a positive inflammation of its skin and areolar tissue. The nipple, once inflamed, is readily excoriated by the suction and friction to which it is exposed, and thus is established that painful affection called *sore nipples*. Sore nipples may be an affection either of the cylindrical part of the nipple or of the extremity of the organ; the former is of less evil consequence than the latter. When the mass of the nipple has once become inflamed, hard, and highly sensitive, it is common to find a quantity of exudation matter, like croup membrane, adhering to the very extremity of the mammilla: when this exudation matter falls off, the surface is left raw, having lost its epithelial covering. If the child be not frequently applied, and the gland be very productive, the heat, painfulness, and tension of the whole breast are distressingly aggravated by the collection of milk within the galactophorous canals. There is no hope under these circumstances that the swelling and tenderness of the mammilla shall become less; the causes act and react mutually, and the inflammation, turning inwards upon the milk-tubes of the nipple, spreads by continuous and contiguous sympathy into one or more of the large reservoirs, which are already over-distended, and, therefore, in a morbid state. The foundation for mammary abscess is very commonly laid in this train.

For the most part, excoriation occurs near the base of the nipple, in a fold or wrinkle of the skin which half encircles the part, and which, when placed in the child's mouth, is to the most exquisite degree painful. Tears are seen to roll down the cheeks of the patient every time she takes her nursling to the breast; and she comes at last to lose her spirits and grow moping and melancholy, to such a degree as greatly to retard her convalescence, or even cause an attack of fever of a serious nature.

There can be no surer proof of the difficulty of curing any disorder than that drawn from the vast variety of remedies for it. It is well known that the remedy for intermittent fever is the Peruvian bark, or its preparations—everybody is agreed on that point; as also mercury is a proper remedy for lues—which few persons doubt. But, as to sore nipples, the whole world seems to have been ransacked for cures, and in a thousand lying-in rooms we shall find a thousand different *cures*, which, after all, are not capable of curing the malady. For my own part, I do not believe in the cucumber ointment, so praised by Velpeau, nor the unguentum populeum, nor the lead-water, nor the castor oil, nor the borax and brandy of Sir Astley, nor the infusion of green tea, nor the slippery elm bark. I make it a point to examine the sore nipple for myself. If I find an excoriation or an ulcer seated upon a nipple actually turgid with inflammation, and highly sensitive to the touch, I advise some blood to be drawn by a circle of leeches set on the white part of the breast just beyond the areola. This leeching, followed by an emollient poultice of flaxseed mixed with crumbs of bread and milk, to cover the whole nipple and areola, is soon followed by a reduction of the inflammation. When that is subdued, the crack, fissure, or ulcer begins to heal very kindly under the gentle stimulation of a weak solution of nitrate of silver. But one might vainly try to cure the ulcer before the inflamed base on which it rests is cured. When the substance of the nipple is cured, the sore on the surface will heal for anything or for nothing. After the nipple in substance is relieved, the cucumber ointment, or a true pomade, made with scraped pippins stewed in prepared lard or any proper basis of an ointment, causes the cure to be soon effected. As this ointment is a very useful one in many occasions of disorders of the breast, I will not refrain from giving the Student the following formula for its preparation; and though I am no great believer in the virtues of salves, I shall not blush for having descended to so small a particular as this. I beg leave to add that, as the ointment cools, it should be constantly stirred or moved with a wooden spatula, which serves to give it a granular character.

Take of—White wax two ounces;
Deer's suet six ounces;
Oil of almonds two ounces;
Scraped pippins four ounces;
Dried currants two ounces;
Alkanet one drachm.

Mix.—Melt in a water-bath, and simmer for a sufficient length of time; strain the hot liquid, and beat it in a mortar or on a slab to make a proper ointment, stirring until the ointment is cold.

In those cases where the pain is very great, a present means of relief or palliation is to be found in touching the sensitive part with lunar caustic, which, though it smarts for a few moments, is soon followed by a diminution of the sensibility and pain. Let the caustic touch only the excoriated part; if it act on the parts not already excoriated, abrasions of the sound epithelium follow, with a corresponding enlargement of the sore.

In applying the nitrate of silver, one should use a very fine-pointed camel's-hair pencil, which, being moistened with water, may be touched with a portion of solid nitrate, until the water in the brush shall have taken up a sufficient quantity of the salt; with this delicate point, the cracks or fissures, being slightly stretched apart, may be accurately touched on the granulations, so as to avoid the risk of destroying by the caustic the tender margin of cicatrization whose white band girdles it; to take a thick piece of solid nitrate is to put off the cure for a whole day longer, which is a great evil.

The late Dr. Physick, whom I consulted in regard to a most painful excoriated nipple, taught me that I should cure the lady as I would cure an incised wound or any ulcer—that is, by bringing the edges as nearly as possible into contact. A bit of fine ribbon, called taste by the shopkeepers, was thinly spread with adhesive plaster; and very narrow strips of the plaster, several inches in length, having been prepared, were applied in a direction transverse to the fissure or crack, so as completely to close the wound or ulcer; the strips were removed for the purpose of giving suck, and always replaced immediately afterwards. The method of the good surgeon was rapidly and completely successful, as I have found it to be on numerous other occasions since that time.

During the process of cure of sore nipples, very great comfort is obtained by causing the child to suck through an artificial nipple, made by covering a proper shield of pewter with the prepared teat of a heifer. Such artificial nipples are prepared in great perfection, and sold by the apothecaries in this city. They prevent the direct contact of the child's gums and tongue with the diseased organ, and thus allow the parts to heal with great celerity in some instances. It sometimes happens that the child refuses such a nipple; but in the great majority of cases the infant takes it well, and the pain and inflammation soon afterwards disappear. There is also a variety of shields or caps for covering the nipples, in order to prevent them from being pressed or rubbed by the dress of the patient.

When the breasts are filled with milk, their lactiferous tubes are liable to over-distension to such a degree as to excite in them an inflammatory action. They are also, in this state, liable to injury from the pressure of a tight dress, or from the use of a dress so loose as to allow the heavy organ to be suspended by its own tissues, a thing painful and irritating to the last degree; or the breast is exceedingly liable to be injured by the mother lying upon it in her sleep, or by the child bruising it by bumping its head against it. Lastly, as I have already said, the irritation of a sore on the end of the nipple is readily propagated along the course of the milk-tubes into the substance of the breast, so as to produce there a more or less violent inflammation. Cold and damp air, to which the woman sometimes imprudently exposes the organ while in the act of suckling the child, especially if while in a state of perspiration, is a pretty frequent cause of the difficulty; and, indeed, there are to be met not a few females who possess what may with great propriety be called an irritable breast, and to such a degree that the slightest exciting cause, as cold, pressure, distension, or the like, establishes the inflammatory action at once. Some people are so plagued with frequent attacks of milk-fever or weed, that they are compelled to wean the child, in order to get rid of the milk and the irritability which it brings along with it. I know a lady who has had the breast so irritable that, whatever cause happened to excite a too active movement of the blood in the vessels would seem sufficient to establish so great an affluxion to the breast as to inflame it to her great distress, trouble, and disappointment.

The Student ought to be made to understand that, after entering upon the practice of physic, he will very often be called on to give his opinion for nursing women, whom he will find con[illegible]ng of headache, pain in the back and limbs, with a very frequent, full, and hard pulse; these symptoms having been ushered in with a chilly fit of one or two hours' duration. He will rarely fail, under such circumstances, to make at once a correct diagnosis, if he asks the question, whether there is pain in one of the mammary glands; and if answered in the negative, let him not give up the inquiry, but let the gland be pressed betwixt the thumb and fingers. If there is any soreness there, it will in this way be readily detected. A small lump is very likely to be found, as big as a nutmeg or larger, which alone is sufficient cause and explanation of so much constitutional disturbance. The inflammation and obstruction of a single galactophorous tube are sufficient to produce chill, fever, cephalalgia, and pains in the limbs, like those of break-bone fever.

Whenever this milk-fever, or fever arising from an irritated state of a part of the mammary gland, is very great, the patient ought to be bled. Eight or twelve ounces will mostly be enough for one operation; a smart purgative should be afterwards given; the patient directed to put a poultice of milk and bread upon the painful part of the breast, and to keep her bed. It would be most unfortunate for her to refrain from suckling the child, which ought to go to the breast whenever it is found to fill up with its milk.

In the course of a few hours after the bleeding and the operation of the cathartic, fifty or sixty leeches should be applied near the painful part, unless the local disorder should by that time be greatly reduced in intensity.

These leechings are highly useful, and ought to be repeated daily in those cases which seem not to require or admit of the employment of the lancet, but which at the same time demand the local abstraction of blood. In one patient here, I had a large number of leeches applied to the breast; they were useful, but did not cure the pain and obstruction. The leeching was repeated seven times before the inflammation gave way. In a subsequent confinement, they were applied nine times before they succeeded in relieving the distended, hardened, and painful tissue of the breast.

It may be said, the mammary gland is suspended upon the skin in front of the thorax: whenever it becomes heavy from engorgement or from obstruction of its milk-tubes, it tends to fall downwards from its weight, and in doing so the natural relations of mutual tension of its integral parts are disturbed, I might say destroyed. To explain myself fully, I will say that the gland is dragged, pulled by its weight, and that the nerves and bloodvessels of supply are put uneasily and even pathogenically to the strain, just as happens to the testis in a hernia humoralis.

As I think no surgeon would, at the present day, treat a hernia humoralis without the aid of a suspensory bandage, so I am equally sure no thoughtful practitioner would undertake to treat a violent case of mammary inflammation or mammary abscess without providing some proper means of suspending the organ, or preventing its fall downwards. A fasciola or strophium of some sort should be resorted to in every such case; and I advise the Student to make use of a fasciola or strophium consisting of a strip of patent adhesive plaster, sixteen or eighteen inches long, and little more than an inch in width. Let one end of this adhesive strip be carried far back and high up under the axilla, and fixed to the skin there; then let the breast be raised up by the hand to its normal position, and while so supported, let the plaster strip be brought round underneath the hemisphere, and carried upwards until the end applies itself as high as the opposite clavicle. One such strip will be in many cases found sufficient to cure even a violent inflammation of the mammary gland, just as a considerable orchitis is often cured by a suspensory bandage alone.

I exhort the Student of Medicine to make himself well acquainted with the uses of the breast, the nature and sources of its circulation; its innervation and absorption, as well as its secreting office, to fully prepare himself to combat the ills that menace those who confide to his skill and conscientiousness the preservation of their health in the lying-in room. It is difficult to conceive the amount of poignant distress, depression of spirits, and actual illness attendant upon some of those cases of mammary abscess which, from beginning to end, occupy months, besides ruining the gland, to the great detriment of the patient in future confinements. A mammary abscess, which is a very serious matter, demanding a conscientious regard to the fulfilment of all the duties incumbent on the practitioner in the case, is often treated with neglect and indifference.

Lying-in women being mostly managed by their monthly nurses or friends, it is difficult for the physician to make either the patient or her attendant understand the true wants of these cases. I am sure that a great proportion of the mammary abscesses that I have met in my life, have been the direct results of over-distension of the milk-tubes; nor can I well understand that one, or a dozen galactophorous tubes, or milk reservoirs, as large as swan-quills, should be filled with milk to their utmost capacity, for several hours, without determining in their mucous and fibrous structures a hyperæmic and hyperneuric condition, to result in inflammation. But such inflammation passes through such tissues to the gangue or basement of cellular tela by which they are invested; heat, swelling, pain, and redness of the parts follow such engorgement in the course of a few minutes, or certainly in the course of a very few hours: this condition is likely to be aggravated by the increased distension which a failure to draw off the milk, whether from ignorance or timidity, invariably produces.

I believe the Student cannot possibly become too vigilant and anxious to explore, and understand the mischievous tendency of the engorgement now spoken of: he should give such directions as to emptying the breast, either by the aid of the nipple-tube, the breast-pump, or other method, as may save his patient from the distress of a mammary abscess.

A mammary abscess for a lying-in woman is a great misfortune; it almost deserves to be called a catastrophe; and for a woman, indeed, who has had a bad constitution, or one with a strumous habit, or one prone to tuberculosis, a mammary abscess is a circumstance replete with alarm and danger. If the suppuration be very deep-seated, it sometimes happens that many days, or even weeks, are passed before the matter of the abscess makes its way to the surface. In the mean time, a constant fever, exhausting perspirations, and a state of the constitution that can only be truly characterized as hectical, attends the painful and reluctant progress of the suppuration outwards. But, suppuration, when it takes place, often attacks several of the different loculi in which the independent packets and bundles of the milk-tubes, and the granules of the gland, exist; so that a woman is affected with an abscess which is really multilocular in its nature, and which, when evacuated, allows the cavity to be converted into winding and many-celled sinuses, difficult to cure, and often lasting for weeks and months. I need not allude to the exhaustion, the pain, the hectical fever, and the wasting discharges of suppuration. It is, indeed, a deplorable circumstance for a lying-in woman to be attacked with a mammary abscess, and particularly as regards the great domestic vexations often produced by it. The young child is often the victim of such an accident, and the whole household is in some instances kept in a state of disquietude for an entire year, by the dissatisfaction engendered from the necessity of frequently changing the wet-nurse brought in either to relieve the woman herself, or to preserve the child from the risks connected with its artificial alimentation.

An abscess is a circumscribed cavity containing pus. One of the chief causes of the pain that attends it is the tension, and it is desirable that its character as abscess should be abolished as soon as it may be done conformably with the interests of the patient. When the sac is opened by a bistoury, or by the natural process of absorption, it es to be an abscess and becomes a deep ulcer; the tension and sure are, thenceforth, either greatly lessened or wholly removed. treatment of mammary abscess, however, it appears to me not de ble, in general, to draw off the matter from a great depth below the tissues, because, in doing so, the fistula, through which the matter pes, and which is made by the lancet, is almost sure to become ous, and convert the abscess into a fistulous ulcer. Hence, I ld deem it advisable, in the conduct of such cases, to wait rather longer than in some other abscesses, for the rising of the pus to a point near enough to the surface to obviate this risk.

During the progress of the suppuration, great comfort is obtained, first, from supporting the gland by means of the adhesive fasciola, or strophium; and secondly, from dressing it with emollient poultices. I think that poultices are more useful if they contain the petals of chamomile, or hops, or crushed onions; for the use of these agents, as it appears to me, serves to prevent the formation of those eczematous blotches and patches which are apt to follow the simple poultice of bread and milk, of flaxseed, of slippery elm, or other emollients. I do not think that anything can be more suitable for the treatment of this part of the case than the poultice composed of equal parts of slippery elm flour, flaxseed meal, or crumbs of bread and chamomile petals. As soon as the breast is opened, whether spontaneously or by the surgeon, poultices may be abandoned, and a practice introduced of compressing the breast against the arch of the ribs by long narrow strips of adhesive plaster, which cross it in various directions, take firm hold on the thorax to compress it, and hold it still. The effect of the compression is to counteract the development force of the still remaining uncured inflammation of the tissues.

There is no antiphlogistic that can compare with the power of mechanical compression for cases in which it is possible to adjust it; and it is possible to adjust it for the female breast. Every day, during the treatment, and indeed several times a day, a delicate cereole, made of cerecloth, should be introduced into the opening, and conducted to the bottom of the tube or sac. If the cereole be not disproportionately large, it gives no pain, and its withdrawal is followed by gushes of pus or sanies, whose detention in the bottom of the tube or sac reconverts the malady, restoring it to the nature of an abscess, for an abscess is a circumscribed cavity filled with pus.

It appears to me, that, managed in this way, there will be found few samples of gathered breast obstinately to resist the treatment.

In many instances where the suppuration makes its way to the sur-ice, within or near to the margin of the areola, milk is found to scape along with the pus, and a troublesome milk-fistula is generated y it; sometimes these fistulas of milk continue to flow for a great any weeks accompanied with a very small quantity of purulent atter, and a portion of sero-pus or sanies. To shut up the orifice ith adhesive plaster is to re-form the abscess, since it reproduces a ircumscribed cavity, and the abscess opens again and again—a cause f great vexation. I have found them, I think always, yield upon he daily introduction of a delicate cereole, made of cere-cloth, which hould be carried to the bottom of the cavity, and withdrawn from ime to time to allow of the escape of the contained fluids, but to be eplaced immediately afterwards. It generally happens very soon hat the cereole goes less and less deep into the tube, which, filling up ith granulations from the bottom, at length precludes the possibility s well as the necessity of its introduction—for the fistula is cured.

In the winter of 1840, I attended a lady confined with her first hild. She was so extremely modest that, several days after the birth f the infant, being seized with inflammation of part of the gland of he left breast, she would not allow the nurse to inform me of the ccident, lest I should wish to examine the part. In this way, she ontinued to bear the pain for several days, until it became so great hat my attention was called to it. I advised the use of leeches. Compliance with this order was deferred for two or three days, and hen at last yielded it was too late to do any good. The breast supurated near the posterior surface, almost down on the fascia; the us was long making its way to the surface, which it did at length, nd was evacuated by an incision. The case altogether was rendered most embarrassing one by the timidity and nervousness of the atient, who became so very ill as to excite in me the most painful olicitude. I was for many days anxious on account of a very weary-ng short cough, for which I could discover no explanation upon a ost careful auscultation of the thorax. The pulse was always above ne hundred and ten. Upon going to see her one morning, I found er with the most singular respiration and pulse that I had ever seen onnected with any exterior disorder of the breast. Her pulse was ot less than one hundred and sixty beats a minute, and the respira-ion was more than one hundred times a minute. Her hands were overed with moisture, and from her emaciation, I felt the greatest nquietude upon finding so strange a state of her circulation and espiration, which, she told me, had come on shortly before, having een of the same character once or twice some hours previously to y visit.

After looking upon this strange scene for a minute or two, and after ating the auscultation, I begged permission to examine the breast, h had been more painful. I found a new abscess pointing up er the skin. As soon as I opened it, and with a bistoury cut up a bridge of skin which strongly bound two other orifices, her strange spiration instantly gave place to a very calm and deliberate one, e her pulse also recovered a far more natural rate. This lady, ing lost all her milk, took in a wet-nurse, and after some time re- vered a very perfect health, after the most distressing and protracted ness brought on by a simple, but neglected, inflammation of the lactiferous gland.

In the second volume of *Bright's Medical Reports*, p. 459, there is related a case of what he calls hysteric dyspnœa.

"I was passing," says he, "through the wards of George's Hospital one day during last winter, when one of the surgeons requested me to look at a female patient who had a formidable disease of the mamma. She had been seized with alarming dyspnœa: her respiration was performed with most unusual effort, but it was not so much hurried as laborious; and she complained of a constriction across the chest, which was altogether unconquerable. Pulse very quick. It had been believed by some that she suffered an attack of pneumonia; but there was no cough, and the breathing was rather with effort than with pain or difficulty. Her feet were quite cold; her pulse weak. She was in a state which might have resulted from sudden effusion into the chest, or the bursting of an aneurism. This was hysteria, and assafœtida was its cure."

I wish the Student to compare Bright's case with mine given above; the slowness of the respiration in his with the frightful acceleration in mine, and all coexistent with formidable disease of the mamma; and then observe that my patient was instantly and completely relieved by the bistoury, while Bright's was cured by assafœtida. I should think he would come to the conclusion that neither of the cases was really to be arranged among the hysterical disorders, but was the result of irritation of a gland, having so large a supply of nerves from within the thorax itself.

It is highly advisable to wean the child, when sufficient time has been allowed to ascertain the probable long duration and great severity of a mammary abscess. This ought not to be done too early, because the suction of the breast by the child is a great and curative resource in the management of the disorder: when the inflammation confines itself to only a part of the breast, the other portions of the gland continue to furnish a good abundance of milk, and that milk ought to be regularly taken away, lest its accumulation should add to the difficulty already too great within the inflamed packets, or even invite the inflammation into the still healthy structures.

For *counter-sunk nipple* and *inverted nipple*, I refer the Student to my letter on the Breast, in my work on *Woman, her Diseases, &c.*, p. 673. To the same letter I beg leave to direct his attention for a fuller statement of this subject than I find occasion to present in the present volume.

I shall close this article, by advising every Student who intends to practise Midwifery, to dissect the breast for himself, after having most carefully studied "*The Anatomy of the Breast*, by Sir Astley Paston Cooper. London, 1840, 4to., with a vol. of Plates." This work is really a legacy to those whom, in his dedication, he calls "My dear brethren." It is prepared with an elegance, and liberality, and profuseness of illustration worthy of that great surgeon. The republication of it in the United States, in a style fully equal to that of the London edition, has conferred a benefit not only on the profession, but on thousands of suffering females, whose disorders of the breast would be more fully understood, as soon as that work should find its way, as assuredly it would, through the country.

PART IV.

THE HISTORY AND DISEASES OF THE YOUNG CHILD.

CHAPTER XXIII.

THE child in utero, as has already been stated, requires for its complete development a lapse of nine months, or two hundred and eighty days less or more. It becomes viable at seven months, though some children have lived that have been born much earlier than this; yet it is proper to say that viability is attained at the seventh month.

The viability of the foetus depends upon the evolution and perfecting of its organs to such a degree as to enable it to live a respiratory life. This it could not do until its lungs should be sufficiently evolved to enable the air-cells to receive the atmospheric air, and fitted also to make the transfer of oxygen to the blood and of carbon to the expired air. If a child should be expelled while its air-cells were still undeveloped, it would necessarily perish immediately from the atelectasis; new-born children expelled shortly before their time die, not because they have a complete but because they have a partial atelectasis pulmonum. The heart of a child, in the earlier of its embryonal periods, is a straight tube; it soon becomes tortuous, and afterwards makes two cavities, which are its auricle and ventricle. The progress of the uterine life brings the foetal-organs daily nearer and nearer to the condition of those of the breathing mammal; but it does not attain this condition, until the seventh month of gestation. If driven into the world before the completion of the organization of its heart, it could not be deemed viable or liveable, because it could not successfully carry on the work of oxygenating its brain and nervous mass.

The septum ventriculorum of the foetus in utero is early completed: if the septum auricularum should be also completed before the period of its birth, the child would necessarily be born dead, because there is no route by which the oxygenated blood of its placenta could be submitted to the action of the systemic ventricle, save that by which it traverses the right auricle and the foramen ovale, passing into the systemic ventricle, and that which it performs when driven by the right ventricle into the aorta through the ductus arteriosus. The black blood of its ductus arteriosus enters the aorta below the giving off of the carotids and subclavians: that blood can by no means reach the brain, but goes into the tissues below, where it gives up its oxygen or returns to the placenta to take an additional charge: therefore, none of the oxygeniferous blood of the child can reach the brain, save that which comes into its systemic ventricle through the foramen ovale and the left auricle. A child, therefore, whose foramen ovale should be completely closed in utero—to suppose the case—would necessarily perish with asphyxia, for asphyxia is black blood in the brain; nothing else is asphyxia.

Therefore, the neonatus is necessarily born with an open foramen ovale; but the foramen ovale is covered by a valve that lies on the left surface of the septum, and serves after birth as an operculum or lid to shut the passage. It is probable that the first inspiration of atmospheric air, coinciding with the descent of the diaphragm and the expansion of the thorax in every direction, serves to carry off to the lungs, through the pulmonary artery, a great efflux of blood, which, antecedent to that first act of respiration, chiefly flowed off through the ductus arteriosus. The constantly augmenting facilities of this new pulmonary circulation soon set aside any further necessity for the ductus arteriosus—whose deserted channel becomes a ligamentous band.

The increased amount of blood thus determined to the lungs must have the effect of throwing a greatly augmented quantity of fluid upon the right ventricle; not to say that the right side of the heart carries on a greater circulation after birth than before birth; but the right ventricle cannot but carry on a much greater amount now, because it carries on the whole, whereas, before birth it carried on only a moiety of it, the other half having passed through the foramen ovale.

The passage of the blood from the right ventricle into the pulmonary artery is probably effected with a facility greater than was that of its propulsion into the aorta through the ductus arteriosus; and I can imagine that now, the pressure of the two symmetrical halves of the heart being equalized, the valve of Botalli, instead of floating upwards into the left auricle, by this equalization of the pressure is shut down as the operculum of the foramen ovale; so that, although the child is necessarily born with an open foramen ovale, the equalization of force in the two halves serves to close it immediately after the first act of aspiration. One need, therefore, suffer no disquieting doubts or uncertainty in regard to the openness of the foramen ovale in the healthy neonatus at term.

In the non-viable child, previous to the seventh month, the valve of Botalli is incomplete and is not a perfect operculum; it cannot thoroughly cover the orifice of the foramen ovale. If the child, therefore, be born without a complete valve, it will probably die from asphyxia, from the mixture of its black and red currents in the systemic ventricle; a child, therefore, whose heart is incomplete, is non-viable. Some children born at term appear not to have conformably developed this valve.

A child is rendered non-viable, in consequence of many other faults of development. The astomatous child is non-viable, as is that in which the œsophagus has failed, in part, of its development, rendering the cavity of the stomach inaccessible to aliment. The anencephalous child is non-viable, since important parts of its organization are wholly wanting; the acephalous fœtus dies of course. The child is non-viable in which ectopy of important organs, as for example ectopy of the liver and the whole alimentary canal into the root of the umbilical cord, exists; for the cord, being deciduous, must fall off in the course of a few days, leaving the vital organs exposed to inevitable ruin. The child is non-viable in whom large portions of the rectum fail to be developed, although a few examples are met with in which the surgeon, by a dextrous operation, has saved the life of the child laboring under imperforate rectum; probably those that have been thus saved have failed to produce merely a short tractus of that intestine.

Many children perish in the womb from disorders affecting important parts. Doubtless in the early stages of embryonal life, very slight derangements in the structure of the omphalo-mesenteric vessels, or of the duct of the umbilical vesicle, might and do determine the death of the new being. Children also perish in the womb from diseases affecting parts within the cranium, for the child lives by its nervous mass as truly as the breathing animal does. Diseases of the kidney, and liver, and alimentary apparatus, prove the not unfrequent causes of the death of the child in the womb.

Various affections of the mother produce the death of the child: passions of the mind and physical distempers, to which she is subject, bring it into danger, or destroy its tender existence. Various diseases affecting its umbilical cord; modifications of its placenta, whether as to insufficient magnitude of that organ, or modifications induced by the deposit of calcareous carbonates upon the uterine surface of the placenta; or the establishment within it of the disease called *hydatid degeneration* of the organ; or partial detachment of the placenta, serve to destroy the young child before it is born.

The child, when it is driven into the world, is sometimes found unable at once to establish its respiratory life; it lies still and pale, being perfectly motionless; there is little tension of its muscles; if handled, it appears to be flaccid, or, to use a common phrase, limber, like a person who has fainted. If the cord be taken between the finger and thumb, nigh to the navel, the Student will be able to judge whether or not the heart is beating. If the heart is beating, the pulsations will be felt by the finger and thumb by compressing the cord, in which are the two umbilical arteries. If the pulsations are vigorous, and repeated at the rate of about one hundred and forty pulses per minute, no alarm need be felt as to the security of the infant. In a few moments, the diaphragm will receive its nerve-stream; it will descend, compelling the air to enter the lungs, whose embryonal atelectasis is instantly removed by the expansion of the air-cells; the oxygen of the atmospheric air, combining with the blood of the pulmonary circulation, will hasten to the systemic ventricle, which, injecting it into the brain, extricates there a flash of vital force, that irradiates with instant life every nerve fibril in the constitution. This new and powerful infusion of vital force is made manifest by struggles, by cries, by rapid coloration of the surface, and by all the signs that indicate an established respiratory existence. Sometimes the child scarcely cries, or utters a low whining sound. If carefully observed, it will be found to take very short and feeble inspirations. It has not yet had strength of diaphragm to open in full all its air-cells. If the Student should in such a case cause it to cry aloud, by dashing cold water on its breast and face, he might expect a full and powerful act of the diaphragm to open every air-tube and cell of the now perfected lung.

As soon as the child is found fully to have established its respiration, steps should be taken to sever it and remove it from the mother's couch. As before directed, a ligature should be put upon the umbilical cord, at the distance of an inch and a half or two inches from the navel. Tying of the cord is not an indifferent matter, and it is necessary to examine the ligature that may be presented for the purpose before employing it, and it should be strongly jerked between the two hands, in order to test its strength. It ought not to be less than ten or twelve inches in length; a portion of ligature four or five inches long cannot be firmly held, for it becomes slippery in the moistened hands. If it be not of sufficient strength, it may, in tying the first or second knot, give way, and allow the two hands to separate with violence, which exposes the accoucheur to the risk of tearing the cord out at its root. When the cord is passed around the umbilicus, it should not be tied without taking the greatest care to avoid this sudden separation of the hands that are employed to tie it, upon the possible breaking of the ligature. The cord should be ten or twelve inches long, as I have said, so that, being held in the hands and the knot arranged, it can be fastened by separating the radial edges of the hands, rolling them both outwards in supination, without a direct steady pull. I never think to tie an umbilical cord in any other manner than this, and more particularly as my early experience placed me repeatedly in danger of destroying the child, by suddenly jerking its navel-string, from the breaking of improper ligatures placed in my hands.

In applying the ligature to the umbilical cord, either one or two may mployed. If it should be a twin pregnancy, there surely ought to vo ligatures, lest, if there be a common placenta, the second child ld suffer a dangerous loss of blood, from the untied end of the cord. In those cases in which the placenta is known to be detached, and pushed into the os uteri, it is better to have only one ligature, for, in that case, the blood of the placenta is discharged in considerable quantities from the cut extremity of the cord, thus serving to diminish the magnitude of the placental mass very considerably, and enabling the woman to thrust it forth with less effort and less pain than would be otherwise required.

On the other hand, if, before proceeding to the severance of the child, the uterus is found to be still very large, in consequence of containing the placenta in its cavity, it is better to apply a second ligature; by doing this, the Student would restrain the evacuation of the placental blood, and thereby keep the organ fuller, more plump and solid, which would enable the uterus more readily to slip it off from the utero-placental superficies than it could do if the placenta, by the evacuation of all its blood, should become flaccid, like a wet soft sponge.

The child, being removed, should be washed and afterwards dressed. It should be washed in tepid water at all seasons of the year. The body of the new-born child is usually covered with a flaky, unctuous matter or induitus that is insoluble in water, and is not removable by means of soap; it readily incorporates, however, with oil or lard, or the yelks of eggs. One or two yelks of eggs, beaten up and rubbed over the whole surface of the child, suffice to make an emulsion with the white induitus of the child, which is afterwards readily washed away by means of soap and water; or the whole child should be carefully and thoroughly anointed with a handful of lard, which also incorporates readily with the viscous matter in question, and which is readily washed off afterwards. If the attending nurse is inexperienced, the Student should direct her to use, not a piece of linen or muslin, but a portion of soft flannel, as the wash-rag for the purpose of cleansing the child's body: either linen or muslin slides over the surface and fails to pick up every portion of the induitus, whereas every particle of it is taken up by means of a wash-rag made of the bit of flannel.

In cold weather, the child should be washed in a warm room, and sufficiently near to the fire; but its surface burns readily; let the Student take heed, therefore, that its body is not exposed to be blistered, as I have seen it blistered, by being held too near an open fire or grate.

As soon as the child is thoroughly washed, a piece of linen, four inches wide and eight inches long, should be doubled to make a square disk; in the centre of this disk, a slit should be made with a pair of scissors—it is best not to cut a round hole in it. Through this slit let the remnant of the navel-string be passed, so as to let the double disk of linen lie upon the belly of the infant; the cord should be laid down flat upon this disk, pointing upwards towards the scrobicle: the linen should next be turned up so as to cover it, the right side of the piece should be turned over the cord towards the left, and the left side of the piece should be turned over covering the right, which will effectually envelop the navel-string, which is all the dressing it can require. The object of this dressing is to receive the discharges which exude from the navel-string, and prevent the cord from adhering to the child's dress, to which, without some such precaution, it would soon become glued, and thus be liable to be torn off earlier than the period at which the natural process would otherwise detach it; there is no other use in dressing the navel-string of which I am aware.

As soon as the cord is thus dressed, the belly-band, which is usually made of a strip of flannel four or five inches in width, should be put over it, and the end, carried around the body, may be pinned either at the back of the child or at the side. After this, the child should have a shirt large enough to come down nearly to the hips. If it is too long, it will be constantly wetted with the urinary discharges. Next comes the petticoat, which is usually, in this country, made of flannel, and which has or has not, according to the taste of the mother, a shoulder strap, but which always has a proper waistband. Some persons do not employ the petticoat, but a good many women still use here the barra-coat from the Portuguese, *barra*, an ell of cloth. It is a yard of flannel, more or less, of which one end is fastened around the waist, and the other brought up and pinned in front, so as effectually to cover up the lower extremities of the child—a convenient and facile mode of dressing it in cold weather.

The last covering is the frock. I should hardly deem it necessary to mention it here, were it not, in the first place, that I am writing for Students, who ought not to go to the lying-in room without being provided with some information upon particulars which, though they be of minor importance, are not without their influence upon the comfort and safety of his patient and upon his own success and reputation. But, more than this, I mention it, because I desire here to enter my solemn protest against the folly, the stupidity, and I might say the iniquity of the fashion which induces so many persons, possessing in other respects good sense and good education, to dress their new-born children less wisely than an Osage Indian mother, or the most savage Esquimaux. A child that is born does not surely belong to its parents until it has attained its sixth year; it seems to me that such a child is but a loan on condition of becoming property, provided it be wisely and safely conducted up to the sixth year of its age; for, one-half of the annual product of child-birth perishes in six years. It cannot be that this amazing mortality is an inevitable concomitant of the state of existence, but it must be a result of ignorance and carelessness as to the hygienical conduct of the neonatus and the young child. It is true that a multitude of children are brought into the world endowed with such a feebleness of constitution, or such hereditary depravation of it, as to render protracted existence and maturity impossible; but the population abstracts would find an immense augmentation were a sound discretion to preside over the hygienical management of newly-born children. Now in the United States, from Carolina to Maine, and from the Atlantic board to the western limits of Missouri, Iowa, and Wisconsin, little children are dressed in frocks without sleeves, or having only pretended sleeves, which are really nothing more than shoulder-straps, and that, while the backs and bosoms also expose nearly the whole of the thorax. There would be no objection to such habits for children born between the 10th of June and the autumnal equinox; it would even be advisable so to dress the summer children, in a climate notorious for its intense light and heat: but to dress the children in the same manner, whether born in June or February, is an imprudence which no power but that of Fashion could compel sensible women to commit. But Fashion has a power that often transcends the dictates of wisdom and of common sense.

I wish that in this volume the Student should learn that, although I have invariably, for a long series of years, combated, as far as in me lay, this vicious custom, I have found a few sensible mothers who would listen to and obey my injunctions, but I have found a vast number of children to suffer, and multitudes to perish, from their disregard of the dictates of common sense. I beg the Student therefore to take the matter into his serious consideration, and satisfy his own judgment upon the question, whether a child is safe, the whole of whose tender extremities are exposed to temperatures approaching to and sometimes lower than the freezing point.

The arms of a child are supplied with blood mainly by the delicate tube of the humeral artery. Much of the blood returns in the superficial veins; and great masses of it, either upon the skin or in the fingers, to resist the constringing effects of cold, require a power of the circulation probably amounting to what might almost be called pathological reaction. The superficies of the body covering the lungs is also often chilled, for the infant, "mewling and puking in the nurse's arms," always has the whole front of its chest wet with the excretions of its mouth: such a condition can scarcely fail to expose it to attacks of pulmonary catarrh, of tracheal and bronchial inflammations, and coryza.

One of the causes most destructive to health is cold, especially damp cold; and the new-born child ought to be carefully protected against it by dresses, covering its chest up to the throat, and its arms down to the wrists, and its legs and feet.

I believe that in Europe, where the people by long residence have been compelled to learn the nature of their climate, one would scarcely meet with a child, from the royal infant to that of the beggar, that would not be found better protected against weatherly influences than the children of the United States mothers.

The pretext for this improvident exposure of the neonatus is, that it should be early hardened; but I submit to the intelligent Student the question, whether the surest way to harden a child is not that way which shall conduct it through the first six years of its existence without fever, inflammation, or other disease. If a child be properly covered up, and daily exposed to the sunlight in the open air, it will have the best chance of acquiring what is called a hardened constitution: there is little hope that a delicate child, otherwise cared for, shall pass to the end of the first month of its life without some degree of coryza, some pulmonary rhonchus, or some reactive effort of its vascular system, struggling against the constringing effects of cold damp, from which it cannot be protected except in overheated apartments, which themselves are almost as much to be deprecated.

If a child, protected like a sailor on an Arctic voyage, or like the rudest workman, should be daily sent *sub dio*, to breathe the stimulating and exhilarating air of the streets or country, and if its diet should be properly regulated, there are few diseases to which it would be liable, save those essential maladies which, to use the language of Willis, "*homini omni, soli et semel contigit affici;*" I mean measles, smallpox, scarlet fever, whooping-cough, &c., for I am very sure that the catarrhs, the pseudo-membranous croups, the bowel-complaints, and many even of the cases of tubercular meningitis, are the results of management scarcely wiser than that bestowed upon the child of Ottawa, or the Shoshonee.

With these observations on the dress of the child, I shall dismiss the subject, after proffering one more remark; which is, that the people of the United States seem all to be hurried onward by the universally pervading desire to do what is here called Go-ahead; they are notoriously regardless of the care of their health, and this is attributable, perhaps, to the state of a people, who have but yesterday, as it were, conquered their lands from the swamps and the forest, and have been too busy with progress to attend to the minor concerns of the *savoir vivre.* I hope that no distant generation will be left to discover some portion of the agreeable to mix with the overflowing cup of the useful in the United States. In that case, the mortality reports will be less redundant with the infant proportion, and the whole female American race will present a spectacle very different from that which we now behold, since it is rare to meet with an American wife, the mother of three children, not already broken and ruined in health, by her servitude to the laws of fashion and the raging spirit of progress and *go-ahead.*

Let us now turn our attention to the alimentation of the child. It might be enough to say, for the information of any man of sense, that this is a generical process, for the child was made for the breast and the breast was made for the child, and nothing else, in this line, was made for either; therefore, when the child is fed otherwise than at the breast, it is fed by a succedaneum; every succedaneum is, by comparison, infinitely inferior in value and adaptiveness to the generical food which the Author of Nature supplied for it, and so constructed its organs and parts as to fit them to receive it and be developed by it. I shall not take the trouble, in this volume, to repeat the analyses and the observations upon milk which I have already printed in another work, nor indeed does it require any argument to show that, inasmuch as the proportion of oil, casein, albumen, and water in the milk of the different mammiferous creatures varies according to their genus, so the young of each genus is adapted to the reception of the sort of aliment devoted to its generical nature.

It is true that a young child who has lost its mother must be fed and it is better for it to be fed with cow's milk or goat's milk than not at all; but I hold it to be a sacred duty for all those persons whose circumstances admit of it, to provide the new-born child with the milk of a human nurse, and not to expose it to the hazards—I should say the dangerous risks—of distressing illness and impending death, that threaten the great majority of those children that are brought up on the spoon or *biberon.*

The neonatus comes into the world full of instinctive desires; it will take food soon after its birth, and will satisfy its instinctive cravings to absolute satiety. But I beg the Student to remark that, while the Divine Author of Nature has ordained that children shall be born, he has also ordained that the plenary abundance of their food shall not, as a general rule, be provided for them until the third day after birth. It is not necessary, therefore, to feed the child as soon as it is washed and dressed; I look upon it as a direct flying in the face of Providence, as acting in direct contravention to the law of nature, which is but the command of God, to fill the stomach of the new-born infant with mixtures of saccharine matter, of gruel, or of the milk of quadrupeds; surely, He who made it knows better its true wants than those who, ignoring his wisdom and foresight, make haste to test its digestive powers by these detestable mixtures, instead of waiting the fulness or his own time.

I have warned the Student, however, that hereafter he will encounter much trouble and vexation in consequence of the early and improper feeding of infants under his care, and I exhort him by careful consideration to inform his mind as to the medical duty in such cases. He will never err, he will never go astray as a physician who ascertains clearly the physiological laws of the function or functions placed under his surveillance; and he who in his hygienical ordinances is the best expositor of nature's laws, will be the safest and most successful physician; and it is certain that no human sagacity or skill can ever equal the perfection of those operations that are instituted and effected in accordance with the generical nature of the subject of them.

It is a mistake, and it is a grave mistake, to suppose that the neonatus is in danger of starvation because it is kept until the third day on the supply furnished it from the mother's breast alone; for there is always, after the birth of the child, to be found some small quantity of mammary secretion, which, though it be not properly deserving to be called milk, yet it is possessed in a measure of the properties of that fluid.

The earliest secretions of the milk gland are loaded with a great abundance of colostrum grains, which are to be seen thickly strewn over the field of the microscope, mixed with vesicles and oil-globules, floating in the serum-lactis. Probably the imbibition of this colostrum by the child has some economical relation to its conservation. The colostrum disappears in the course of a fortnight, or at most in three weeks, after the child's birth; I cannot imagine that it is a mere excremental matter, for the breast is not an excrementitial, it is a recrementitial organ, and all that it produces is designed for the advantage of the new-born child.

With these views I am quite clear in advising the Student to direct his patient to take the nursling to the breast at the earliest convenient moment. I have many times seen a child drawing vigorously at the breast within a quarter of an hour after its birth, and I believe to take the child to the breast is the most natural thing for the mother to do. To illustrate this opinion, let me invite the Student to consider the circumstances that might have attended the apparition of the first-born of mankind. The common mother of mankind had perceived the strange sensations and modifications of her form, dependent upon an advanced stage of her first gestation. She resided, perhaps, in some warm sunny valley of the Caucasus, bounded by an amphitheatre of lofty mountains, and enriched with a varied landscape, tinted with every hue and form of tree and flower and grassy mead. A transparent fountain arose, perhaps, near the bower, in which Adam had left her sleeping at the uprising of the morning. He may have climbed some lofty, distant cliff to gather for his bride its Alpine blossoms, or return, loaded with fruits for the object of his tender care. In the mean time, she is seized with the pangs of the first human travail—the terrible fulfilment of the curse on her early disobedience; alone, unaided, in a purely natural state. With that inherent health and strength which we may conceive of as appertaining to a creature which had issued perfect from the hands of its Maker, she advances through the unknown conflict, and, at the moment of its consummation, becomes insensible from the keenness of her anguish. In a few moments she is recalled to her senses by the voice of the new-born child; and, raising her languid head and inclining her bending body feebly supported upon the elbow, she perceives the helpless child of her bosom lying upon the grassy floor of the bower near her. It is not necessary to paint, indeed, it is impossible to imagine, the intenseness of the parental emotions which must have now agitated her bosom; these, instinct alone, would prompt her to put forth her hands and lift her first-born from the earth on which it lay weltering. She would take it up in her hands, her forearms were fashioned that they might be its cradle, its face would fall against her bosom, and it is probable that but a few moments elapsed after the birth of the first-born, until his mother experienced the sensations which only a mother can know, who pours the rich nutritious stream of life out of her own breast for the sustentation and comfort of her new-born offspring. It is perfectly natural, I repeat, that a mother should take the child to the breast at the earliest possible period after its birth. Every human direction and counsel in contravention of this most evident law of nature must be erroneous, save when it is founded upon views relative to the actual state of the mother or child, as setting aside, for the moment, the operation of those natural laws.

Hence some information should be given to the inexperienced mother or nurse in regard to the alimentation of the neonatus. I believe that pure instinct is more unerring than reason, and a better guide in all those cases in which instinct is designed to preside. I therefore look upon it as a tyrannical thing on the part of any physician to prescribe precise intervals between the applications of the child to the breast. I have no idea that any physician can be competent to decide upon the degree of activity of the digestive powers of any young child. The principles of conduct here, are principles to be derived from a knowledge of the wants of the child: a child may want the breast again in two hours, or it may not want it again in six hours. It is therefore preposterous on the part of the physician to say, as I have heard him say, that the child must be applied to the breast every three hours, or every four hours, according to his unerring wisdom. I advise the Student to direct the child to be fed when it is hungry, and allow it to be governed, as to the quantity it takes, by its instinct, which is superior in this matter to his reason.

It is probable that the child within the month, whose stomach can scarcely be supposed to hold, when perfectly satiated, more than two or three fluidounces of milk, will be able to digest and discharge the major part of this quantity into the duodenum, in the course of some three hours after its assumption; but it is probable that the feeling of hunger will begin to return long before the organ becomes completely empty. There are but few new-born infants that are incapable of rejecting a part of the ingested milk; the stomach in this way relieves itself of any excess, which the appetite might induce it to swallow. I have no doubt that a considerable portion of the ingested milk passes as milk and not as chyme through the pylorus. These considerations, together with observation of the facts, have induced me, in general, to say that the child might be applied to the breast about once in three hours; but I am far from prescribing three hour intervals as an absolute rule of conduct, and I have no objection to see the child again applied to the breast within two hours after having thoroughly satiated its desire for food, for I repeat, I rely upon its instinct, which was provided for it before the invention of Physic and Surgery.

The dental formula of animals is the index to their nature, especially to the nature of their alimentation. The state of its mouth is sufficient to make it apparent that the child should be fed upon fluid aliment, up to the time at least of the establishment of its dental apparatus; and nothing could be more stupid than the conduct of those that feed young babies with bits of fat ham, minced chicken, and other articles of food for which the child does not become fitted until the period when nature announces it to be so, by the establishment of an apparatus for mastication.

As a general rule, the child ought to be nursed at the breast until it is twelve months old; if the twelve months should happen to elapse about the beginning of June, it ought to be kept at the breast until the autumnal equinox, since experience declares that in the United States very few children can be severed just at the outbursting of the summer heats, without becoming subject to some degree of digestive derangement, which, when once begun, is not readily removed while the child is nourished artificially, but which either does not attack, or is readily overcome, if the supply be of the kind of food which is natural to it.

As to the nursing of the child, notwithstanding I deem it a sacred duty on the part of the parent to fulfil this obligation, yet it is questionable whether the obligation is not really set aside where the inducement thereto arises from a dangerous condition of the maternal health. If a man marry a wife having a hereditary claim and expectation to perish with pulmonary consumption, it would be better, both for her and the infant, to dispense with the giving of suck. It is probable that the infant has already caught a touch of the taint or the diathesis, almost in the act of conception, and if not then, within the course of the uterine gestation. The sooner all influences of the mother's life over it shall pass away, the greater is the hope of its escaping the terrible fate before it; and on her part, it may be said that the rudest and strongest health is oftentimes much diminished and shaken by twelve months of lactation; but, for a person having in the lungs the invisible seeds of a tuberculosis, to subject such a one to the exhausting processes of the long lactation, is to nurture and call them into a fatal activity.

I do not mean, in these remarks, to recommend that the lying-in woman should at once begin to throw back upon her constitution the fluxional movement towards the mammary glands, which can only be normally counteracted by the proper physiological action of the gland.

Her own safety exigently demands that she should favor this fluxional movement for a few weeks; but after four or six weeks she ought to let her milk slowly dry away, and provide for her child a wet-nurse of unquestionable qualifications for the end in view. I can conceive that, by proceeding in this manner, a family might cast out of its stock even the tuberculous diathesis, in the course of a few generations. It is melancholy to contemplate the misery which is in store for those who, preferring the enjoyment of their natural and praiseworthy sentiments, turn a deaf ear to the warning voice of experience and prudence.

Counsel, however, is to be given by the physician, who is to be all things to all sorts of people; and it must happen that he shall have to counsel those whose circumstances forbid them to defray the extra expense of wet-nursing. Under such circumstances, the child must be fed; milk is its food, and the best succedaneum for its mother's milk is the milk of the cow—indeed, there is none other easily to be had in the United States; and it would be in vain in this country to recommend either the use of asses' or of goats' milk, which, in various countries in Europe, is abundantly provided for those who may find occasion to employ it.

With regard to the artificial alimentation of the child, if the Student should reflect a moment, he will come to the conclusion that the act of digestion is much assisted by the admixture, with the food that is ingested, of a due proportion of saliva. The saliva, though not so essential in the digestive evolution as the liquor gastricus, is an indispensable agent in the act. A child that draws its milk from its mother's breast by the suction power of its mouth may be almost said to masticate it, and in doing so it causes a stream of saliva to pass into the mouth, which is swallowed along with the milk. The proper excitant of the salivary glands is first, perhaps, the presence of alimentary matters in the mouth, and secondly, still more powerfully the motion of the tongue and cheeks and jaws, in eating. Now, a child that is fed from a spoon may be almost said to have the food poured down its throat without swallowing it, and the same is true of the infant that takes its aliment from the edge of a bowl or cup. It is far more convenient and proper, in all cases of artificial alimentation, to simulate as closely as possible the natural functions, and I believe that the child will digest its gill or half pint of food more safely and successfully, if it be taken through the *biberon* than if taken out of a spoon or cup. Let the Student give ample attention to these considerations, and judge for himself whether the remarks be well founded or not, and thereupon base his professional counsel.

Without going here into a comparison of the different kinds of food, I beg to request the attention of the Student to the opinions which I have expressed upon this subject in my work upon *Diseases of Children.*

Of the Navel.—The navel being dressed in the manner heretofore described, it is usually left thereafter to the care of the monthly nurse or attendant, and the physician is rarely called upon to interfere, except when it becomes the seat of some diseased action.

The remainder of the umbilical cord, left after the severance of the child, soon begins to dry; the water of the Whartonian jelly contained in it escaping through the inorganic pores or crevices in the amniotic coat. The vein usually contains a small coagulum of blood, and the arteries become collapsed and entirely desiccated. In the course of from four to seven days, the cord has become so dry and thin as to resemble a piece of transparent yellow horn; the absorbents at the line of the demarcation early commence to cast off the slough, by establishing a crack or fissure all around its root: this fissure, growing deeper and broader from day to day, allows the desiccated vestige to fall away, leaving a small spot of raw surface, often not bigger than the head of a pin; for most of the wound becomes incarned or cicatrized as the process goes on.

While the child is in the womb, and even at the moment of its birth the navel protrudes, often to the length of half an inch; but the two arteries, whose cut ends are attached near the surface of the new-formed cicatrix, act as cut arteries always do, by retracting, and thus serve to draw the navel inwards and downwards in the direction of the urachus. The remainder of the vein, which becomes a cord passing along the edge of the falciform ligament of the liver, is also, but in a less degree, retracted. These vessels serve in this way to draw the navel inwards, and to make the dimple of the umbilicus; but the deepest pit of the dimple will look downwards towards the bladder, for the retractility of the arteries is greatest. When the retraction thus effected is perfect, the tissues are drawn strongly inwards towards the inner aspect of the belly, and the vacuity in the linea alba, constituting the umbilical ring, becomes perfectly closed; but if this retraction be incomplete, then a plug of tissues contained within the circle of the umbilical ring prevents its absolute closure, and leaves the child liable to be affected with exomphalos or pouting of the navel.

It is clear that, in order to aid this retraction and complete it, a proper compress should be adjusted over the umbilicus and retained by the belly-band, whose use ought to be continued as long as its use is indicated. If the child is quiet, and little given to crying and straining with tenesmus, and if the dimple of its navel be perfectly well-formed, the belly-band may be left off at the end of the month; but the least disposition to protrusion, or a wintry season, furnishes motives for its longer continuance.

Of the Meconium.—The meconium of the child is a dark, viscous, green, diffluent matter, which is contained in its colon and rectum at the period of birth.

The quantity is sometimes very great, and the first alvine discharges consist wholly of this material. Three or four of the first evacuations serve in general to carry it all off; occasionally, it is so adhesive as not to quit the surfaces of the bowels: perhaps it is lodged in the cells of the colon, so that the bright bile-tinted stool of such a child, seen upon its napkin, induces a belief that the meconium is all purged off, whereas subsequent dejections show that no inconsiderable quantities have been detained in the intestine.

When the meconium comes off freely, and seems to be entirely discharged, giving place to excretions of a healthy hue and consistence, no medical precautions can be deemed necessary; but if the child is uneasy, crying, fretful; affected with griping pains, which are betrayed by its voice and by the frequent flexion and extension of its lower extremities, with an appearance of passionate impatience, and especially if some portions of the meconium seem to linger upon the napkins one after another, we should have reason to suppose that the surfaces are still vexed and irritated by this excreted matter, which ought to be removed by small portions of castor oil or some other convenient aperient.

Children that feed many times a day will generally be found to require several alvine dejections per diem. A child that satisfies its instinctive desire for food generally does so by filling the stomach until it is quite distended, and it will often happen that some portions of the ingested milk will pass off through the pylorus into the intestinal canal too early to have been subjected to the influence of the gastric liquor. Such portions of milk will, therefore, appear upon the napkins in broken or granulated coagula of a white color.

Most children, after filling the stomach to distension, enjoy the happy faculty of regurgitating the excess, so that the stomach soon becomes relieved of its over-fulness, retaining less than it has received, and subjecting it perfectly to the gastric digestion. A child that in this manner rejects the superfluity, and completes the digestion of what remains, will have small residue of its digestions, and therefore will have fewer alvine discharges, which shall also be smaller in quantity than those of the child a portion of whose undigested milk passes into the duodenum and jejunum.

Without being able to speak positively from careful observation, I venture to state that the neonatus in perfect health has three or four changes of its napkin daily, and I conceive that this is not too great a number; at the same time, I presume that a child might be very well, having only one dejection per day, provided it is known to have the faculty of regurgitating the superfluous ingesta, and provided also it has the appearance of enjoying a complete health.

I beg to inform the Student that he will meet with a good many children which shall have eight, ten, sixteen, twenty dejections per diem, and that he will often be called upon by anxious parents to prescribe for such seeming diarrhœa. The case to which I allude is not a diarrhœa; it is a case in which a child, nourished at a free and abundant breast, fills its stomach again and again with a gastromorphous clot of milk, a major part of which, being comminuted by the contractions of the organ, is driven off undissolved through the pylorus, because the child has not the power to get rid of it by regurgitation.

When I am called upon to give counsel in such cases, I do not always take for granted that the child is sick because the nurse or mother tells me it is so, nor do I admit that it has a diarrhœa because it has twenty stools per day. Under such circumstances I have often said, let it alone, do not interfere with the case at all, except by regulating the amount of its food; do not give it such frequent opportunities to suck, and judge carefully when it shall have got what is necessary for it, and then put it away. If you give medicine to stop its diarrhœa—which is not diarrhœa, but a result of repletion—you will make the child sick, for if the child continues to live in the same way, so as to require twenty napkins per day, and you prevent the action of its bowels, by means of some astringent or narcotic medicines, you will make it really ill—it is a case for hygiene, not for therapeia. It has twenty evacuations daily; well, be it so. Examine the dejections, and you will find that they consist almost wholly of the whey of milk. The child keeps the curd and digests it—but the whey is more than it can keep, and so it passes off by the bowels in the form of what you call diarrhœa. But it is not diarrhœa, it is whey.

I do not fear that I shall mislead the Student by the above observations, because, if he be a man of sense, he will judge for himself, and not from a book; he will inquire what is the nature of these dejections which are accused of being diarrhœa, and if he should find that they are such as I have above described, he will perhaps remember my words, and act in accordance with the indications that I have pointed out. If the stools consist of masses of slime—if they are altogether bilious—if they give evidence of an excessive acid saburra, then he will inquire into the particular wants of the case, and prescribe accordingly.

The mucous, the bilious, or the acid saburra may require only a teaspoonful of castor oil, a small quantity of rhubarb, a portion of magnesia, a half grain of calomel, or calomel with chalk. Perhaps he will be enabled to fulfil the therapeutical indication by prescribing a portion of lime-water and milk, or a little soda or potash mixed with water alone, or mixed in infusion of chamomile or some other bitter or aromatic garden herb. Possibly, he may find the fault to consist in a hyperneuric condition of the muscular apparatus either of the small or of the large intestine, and he will correct such an hyperneuria by means of an anodyne draught. An anodyne draught for the new-born infant should consist of half a drop of laudanum in a teaspoonful of water. To give half a drop of laudanum, let him direct the nurse to put two teaspoonfuls of water into a cup, and add one drop of laudanum thereto, which, being perfectly mixed and compounded, permits him to give, in one teaspoonful of the mixture, just half a drop—the other should be thrown away.

Sometimes the new-born child, instead of being troubled with too many dejections, is affected with costiveness. This costiveness is overcome either by a suppository of molasses candy, of a bit of castile soap, or a camel's-hair pencil dipped in castor oil, and thrust just within the grasp of the sphincter muscle. It may be remedied by an enema of tepid water, or water quickened with a modicum of salt, or molasses or castor oil; or the child may take a teaspoonful of a weak infusion of rhubarb, or a little magnesia, or a little rhubarb roasted in a saucer until it is slightly browned, or, what is better than all, a pinch of pure precipitated sulphur mixed in water sweetened with honey or honey of roses. Small portions of sulphur, mixed with honey water, appear to me to operate upon the neonatus more kindly than any other therapeutic agent, in this peculiar case; and the use of it, continued for a few days, often serves to remove an habitual disposition to costiveness. The Student should judge, however, in the cases committed to his care, as to the cause of the constipation. He knows, or he ought to know, that the bile furnished by the liver is the natural eccoprotic, and that, if that bile should be in just quantity and of due quality, it should take the place of all rhubarb, senna, and purgative drug.

If therefore, upon inquiry into his case, he discovers a deficiency in the quantity of the bile, or such modifications of its tint and other qualities as seem to call for his therapeutical intervention, let him judge as to the precise nature of that intervention. Let him ask himself what is the source of the blood that gives rise to the secretion of bile, or from which the bile is secerned, in the eliminating apparatus of it, the liver. He will see that the whole of this blood came from the aorta, through the cœliac and two mesenteric arteries; that the chief torrent of it, after being passed through the capillary circulation of the intestinal tube, hath been collected again by the radicles of the great portal vein, which lets it into the liver to be distributed through the hepatic branches of the vena portæ to the capillary tufts in the acini, whence it is carried off again by the nascent radicles of the hepatic veins, which are to discharge it into the cava—and so his question is answered, for he will scarcely believe that the hepatic artery is the secreting tube, but only the nutritious artery of the liver. When, then, he finds a child disordered as to the action of its bowels and liver, I hope that he will cast his eyes upon this great system of what the ancients called the mesaraic circulation, so that, inspecting the whole field of it, he may discern in what point of it the pathogenic principle resides.

I should think that he could not but look upon a hyperæmic condition of the capillary system of any large portions of the alimentary tube as matters important for the performance of the secerning functions of the liver; and see that retardation in the movements of the great intestinal portal system, or of the great hepatic portal system, cannot but be regarded as giving rise to sufficient causes for those modifications of the functions of the liver which he desires to cure. Under these views, it will not always be for him inevitable to administer mercurial remedies for slight derangements of the bile. He will rather provoke the peristaltic fibre to greater or to renewed action, with a view to remove those embarrassments of the portal or mesaraic circulation which he shall accuse of causing the bilious disorder, and he shall find that a teaspoonful of castor oil, or a pinch of rhubarb, or a modicum of magnesia, or an innocent dose of precipitated sulphur, is quite as effectual, and abundantly more safe than the vaunted power of the mercurial dose in these affections.

It appears to me that in the United States there is an indissoluble alliance between the word *liver* and the idea *calomel*, and that the notion of the alterative power of calomel springs spontaneously at the least suggestion of an hepatic or bilious derangement. I do not deny that calomel is a purgative, nor that it produces the most distressing nausea when taken into the stomach; nor that it may therefore, upon proper occasions, be rightfully administered, even to young children; but an examination of the circulation and of the innervation in those parts which stand before the gate of the liver, and which serve, as it were, as propyla, admitting the torrents of circulation into it, out of which the bile is to be taken by it, ought clearly to point to states of those parts, I mean the mesentery, the mesocolon, and the alimentary canal itself, as often the seats of those pathogenical influences which are discoverable only in their effects in modifying the bile.

I beg the Student to get the baby through the month without mercury, if possible; since, though I deem mercury an admissible remedy, I consider it a most desirable thing for the young child to avoid its too dangerous and powerful influences—influences capable of making such a profound impression upon the constitution as shall be felt in long after years. For my own part, notwithstanding I have long been laboriously engaged in the practice of my art, I feel very confident that I do not employ one hundred nor even fifty grains of calomel in the course of twelve months; and that my patients are not the worse off on that account; while I myself am preserved from an intolerable anxiety which its administration always excites in my mind.

Of the Gum.—Children coming into the world—issuing from the soft and unctuous waters by which they have been surrounded—are first washed clean, and then exposed to the stimulating effects of the atmospheric air; and are, then, covered with clothes, all of which things serves to irritate the tender and sensitive outer covering of the body, the derm. Moreover, the first copious indraughts of atmospheric air, changing the blood and converting it into tenfold more oxygeniferous streams, must have the effect almost of an intoxicating inhalation, like nitrous oxide, upon the child. The corpus mucosum of the skin becomes instantly reddened after birth, and, in many children, so red as to present the appearance of engorgement or inflammation; and there are not a few of them, indeed, in whom, in this first burst of dermal circulation, the hyperæmia is so considerable as to be followed, in the course of a few days, by desquamation, like that which succeeds to an attack of measles or scarlatina. We should not be surprised, therefore, to observe slight inflammations and eruptions of the superficial tissues. There are few children, indeed, who fail, in the first three or five days after their birth, to be attacked with a slight papular eruption which is called red gum—a case in which a central papule is environed by a red aureola. It requires no particular treatment, since, like a vaccination, it tends to cure itself. Common custom and usage, however, prescribe the administration of weak aromatic infusions, which are supposed to possess a diaphoretic quality. Infusion of catmint, infusion of fennel or anise, infusion of saffron, &c. &c., are commonly resorted to, and as they do not much harm, it is not always, perhaps, the province of the physician to object to their exhibition.

This red gum, or *strophulus intertinctus*, differs from the other sort, *strophulus albidus*, which exhibits a larger papule, more nearly resembling the blister of varicella, though much smaller than the varicella. It is not surrounded by a red aureole, like the *strophulus intertinctus*.

In children affected with either form of these eruptions, it is highly important that the skin should be frequently powdered with some proper fecula, and there is none preferable to that of the arrow-root. The application of the fecula, under such circumstances, appears to me to possess a remarkable power to appease the hyperæmic and hyperneuric condition resulting in this form of eruption.

Sore Mouth or Aphthæ.—In the course of a few days after the birth of the child, it is common to find it a little more sleepy than ordinary, and to hear the nurses say, "It is sleeping for the sore mouth;" and soon after, upon examining the interior of the lips, the gums, and the tongue, they are found to be overspread with very minute white flakes, that look like small curds of milk. These are aphthæ, or the thrush, or the child's sore-mouth. The white deposit consists of a small quantity of excretion, albuminous, or, possibly, fibrine of the blood, which is held in contact with the surfaces from which it exudes, by a delicate film of epithelium, so that, with the finger covered by a bit of rag, the white speck cannot be wiped away.

In a short time—that is, in the course of a day or two—the pellicle of epithelium gives way and the crust falls off, leaving sometimes a minute sore, and sometimes a renewed surface of epithelium, from which the white crust has fallen away.

Of course, this malady is the result of inflammation of the corpus mucosum of the interior of the mouth and lips, and it is to all intents and purposes a true stomatitis, or mouth-inflammation. In nine cases out of ten it cures itself, and it is, probably, in its nature very like the *strophulus intertinctus*, or *strophulus albidus*, of which I have just spoken, which are affections of the mucous body of the derm, whereas this is an affection of the mucous body of the mucous membrane.

It is usual in this case to accuse the child as laboring under an acid saburra, and to furnish it, in consequence of that accusation, with a dose of physic, which for the most part it does not really want. But, inasmuch as this mild stomatitis may rise to a considerable height, becoming, in fact, a general and extensive inflammation of the tissues within the mouth, extending backwards into the fauces, and from the isthmus faucium into the throat, it is worthy of attention on such occasions, and should be treated in conformity with its nature.

The custom, among physicians and nurses in this part of the country, is to attack the local malady by means of portions of borax and powdered sugar, of which a pinch is frequently to be put upon the tongue of the child, and is supposed to have sovereign power as a remedy for the malady. There is little objection to the use of the biborate of soda; and it answers a good purpose, being a substitute for severer and useless remedies: now and then, when the stomatitis rises to a great and dangerous height, it is useful to wash the mouth of the child with a mixture of lime-water and fine Peruvian bark in powder; or to touch the irritated surfaces with a camel's-hair pencil, dipped in a weak solution of nitrate of silver, of a strength ranging from one grain to two or three grains to the ounce of distilled water; or a solution of sulphate of copper in combination with sulphate of quinia. Two grains of the former and half-a-dozen of the latter, in an ounce of water, furnish a mixture which may be efficaciously applied by delicate contacts of the camel's-hair pencil to the affected parts. If fever arise, or saburra or disorder connected therewith, let the Student bethink himself of the efficacy of his doses of calomel or magnesia, or aperitive medicine of whatever kind.

There is another kind of sore mouth which looks like this, and which is called muguet, and which is, I think, not so often met with in this country, as by some European practitioners. It is supposed to be a vegetable substance attaching itself to the interior of the mouth, and *sporiferous* in its nature, so as to be capable of greatly extending itself when once planted there. It differs from aphthæ or thrush by being uncovered, or having no investment of the stomal epithelium. I am not familiar with it, and refer the Student to the authorities for further information.

Icterus.—The neonatus is very liable, in the course of a few days after its birth, to be affected with a yellowness of the whole skin and eyes, and to have the urine so stained with bile as to impress its color upon the napkins when dried from the urinary discharges.

The icterus of the young child doubtless depends upon the regurgitation of bile from the pori biliarii into the returning branches of the hepatic vessels, whereby the whole mass of the blood becomes stained with its yellow coloring material, which begins to appear first upon the colorless adnata, and next upon the whole dermal surface. Such a state of the skin does not imply a primary disease of the liver itself, since there are certain irritations affecting the duodenum, producing some degree of engorgement round about the ductus communis choledochus, and passing up along that tube, which might well suffice to detain the secreted bile in the pori biliarii, and cause its regurgitation in the manner above indicated. A dose of purgative medicine, freeing the stomach, and duodenum, and jejunum from some certain saburra, and relieving them thereby of a troublesome hyperæmia, seems to me likely to set the gates of the bile wide open, so that, the regurgitation no longer being effected, the constitution soon eliminates the coloring matter of the bile from the blood, leaving the skin to recover its healthful hue and softness.

My clinical experience, which must have furnished me with numerous examples of these early hepatic derangements, as they are supposed to be, has left with me no painful impression of the dangerousness or the troublesomeness of the affection, which is transitory, disappearing in the course of a very few days.

In those cases in which the inspection of the dejections shows that the bile escapes freely through the ductus communis into the duodenum, I am always willing to wait for the result of such outflowing of the liquid and the spontaneous return of the liver to its normal functional rate. Whenever, on the contrary, I discover whitish or clay-colored stools, or stools tinted faintly with a whitish-yellow bile, I am willing to administer to my patient some doses consisting of the sixth part of a grain of calomel, repeated three or four times a day, and followed by a convenient quantity of castor oil or magnesia, or other approved aperient.

Coryza.—Many young children suffer severely, soon after birth, from attacks of coryza, commonly, by nurses and old women, called snuffles, and, when the attacks are severe, morbid snuffles. Some children, indeed, appear to me to have come into the world giving evidences, with the very first acts of respiration, of the presence of this malady. I do not mean to say that they have coryza before they are born; but rather that they are born with certain tendencies which allow coryza to declare itself immediately after birth.

Coryza or snuffles is inflammation of the mucous membrane of the nostrils and air-passages of the head in general, occasioning a great abundance of mucus to be excreted from them; which, filling up the air-passages and obstructing them, causes the child to breathe with difficulty, making a rattling or sniffling noise with every respiratory movement.

Many of the cases, being very slight, and going off after a few days, scarcely serve to attract the attention of the physician, and the wise women content themselves with the usual remedy, which consists, in this country at least, in the application of a little grease or tallow to the bridge of the nose. While it is perfectly true that coryza is in many cases a matter apparently of small moment, yet it is proper for the Student, when he observes its existence in the little nursling, not to pass it by idly and without notice, for it is capable of producing the greatest annoyance in the lying-in room by interrupting the sleep of the baby, and thereby interfering with the repose of its parent, a circumstance always to be deprecated. But more than this, coryza may kill the child outright—a thing to be deplored, in itself considered, and perhaps still more to be deplored on account of its possible influence on the health of the mother, who, in the early days of her lying-in, is easily moved by slight pathogenical causes, which, when they but begin to operate, may have results the most disastrous.

Let the Student, therefore, not idly neglect a case of coryza in the neonatus; but he should extend his watchful care both over it and its hyperæsthetic parent. A lying-in woman is not like anybody else, and things may kill her, which, under other circumstances, might pass by her as the idle wind.

I wish the Student to remember that the new-born child has no reason, but only instinct; that it is a purely instinctive creature, and implicitly obeys the provocations of its instinctive nature. It has an instinct to breathe, for which purpose it is supplied with only two respiratory stigmata, to wit, its nostrils. It has another aperture, its mouth, which its instinct teaches it to use only as an agent of its alimentation, not as an agent of its respiration. I wish the Student to understand that, if one should stop the nostrils of a new-born child with two plugs of cotton or lint, so that no air can enter into those respiratory stigmata, the infant will surely die within from one to three days, because its instinct teaches it to breathe through its respiratory passages, and not through its mouth. I am sure that the subject of such an experiment would persistingly close its mouth or its isthmus faucium, and perish under vain attempts to continue its respiration through the closed up nostrils.

When children die from coryza, as they not unfrequently do, they die in the manner just pointed out; and I adjure the Student, who shall read this passage, to give his careful and candid attention to the doctrines set forth in it, and, looking upon the child that is seriously ill with coryza, see how, after making repeated attempts to aspire air through the nostrils, it suddenly starts forward, throwing out its hands with an appearance of agonized distress, and then, opening its mouth widely, suddenly makes a full and complete aspiration of air, which, dispelling for a moment the sense of suffocation, permits again the renewal of its vain attempts to breathe through the natural openings. If it had reason to guide it, as a man has, it might breathe by the mouth, with perfect facility throughout the most dreadful attack of coryza, even coryza maligna; but it has only instinct for its guide, and that instinct teaches it to breathe through the nasal openings.

I will take this occasion to remark that loss of life from coryza is to be observed sometimes in children many months old, and that a child even over two years of age may be lost in this way, as I have learned by disastrous clinical experience; and if the Student who reads these passages should find any hesitancy in his mind to admit the truth of my explanation, I believe that all doubt would vanish from him if he would please to make the following experiment. Let him compress the alæ nasi together with his thumb and finger, and then make half a dozen consecutive attempts to breathe, keeping his mouth shut at the same time; he will find that the effort to send down the diaphragm and expand the thorax will produce within the whole chest a deep feeling of distress, amounting almost to pain. But let him repeat the attempts five or six times consecutively; and then, while making the last attempts, suddenly open the mouth and permit the air to rush in a torrent into the air-passages, he will have the sensations which I attribute to the young infant, when, after its repeated attempts to breathe through the nostril, it starts forward, throwing its hands wildly abroad, and filling its lungs with air through the opened mouth.

If the Student, after experiencing these sensations, will reflect upon the effect of such efforts, repeated through two or three consecutive days by a tender infant, just born into the world, he will agree with me that stopping of its nasal passages is a thing greatly to be deprecated. I do not mean him to understand that in ordinary cases of coryza the child takes no air through its respiratory stigmata, for it does get that small portion on which it subsists in that way, up to the period, at least, in which the apertures, having become totally obstructed, compel it at last to make the sudden and convulsive aspirations through the mouth which I have attempted to describe. But the difficult and interrupted aspiration of air through nostrils only partially obstructed is sufficient to diminish the amount of oxygen breathed upon the blood, and the torpid and imperfect innervation produced by the imperfectly oxygenized blood in the vessels of the brain is followed by various derangements in the action of the organs whose force depends upon the regular supply of the *vis nervosa*.

A young child, then, laboring under a considerable coryza, will have carboniferous blood in the systemic circulation; it will be pale, languid, and unhappy, and is always exposed, in consequence, to attacks of pulmonary or cerebral or abdominal disorder. I look upon a child, whose nostrils are half stopped up, whether by mucus, or by submucous infiltration, as in a state analogous to that of an infant laboring under a moderate degree of pseudo-membranous laryngitis: for the one or the other equally prevents the aëration of the blood with its normal amount of oxygen, and all the consequences of such a state must result.

I ask the Student whether the constitutional disturbance arising from such a degre of disorder as exists in the Schneiderian surface in a case of coryza could possibly be so disastrous, were it not for the accidental interruption occasioned by it to the oxygenating power of the respiration. I should think that an inflammation ten times more violent would be incapable of producing so great an amount of constitutional disorder through any other means than those above alluded to; for the reaction of the heart and arteries occasioned by it, and the distress of the nervous system occasioned by the perception of it would be nothing—I was going to say less than nothing—were it not for the accidental interruption to the oxygenation. Therefore, I repeat that the slightest attack of coryza is worthy to be regarded.

But the question arises what shall we do for the cure of this case; how shall we free the Schneiderian membrane from its hyperæmia and hyperneuria; how shall we prevent its follicles from furnishing this excessive amount of mucous, or how shall we take away the submucous infiltration, which causes the cavities to collapse and at last to close them? Will the vulgar remedy, greasing the nose, have this effect? Certainly the Student cannot rely upon such a therapia as that. Will he purge the child? Will he give it a warm bath? Will he apply a leech within the margin of each nostril? Will he give it diaphoretic remedies? Will he regulate the temperature of its apartment? Will he cause the aperture of the nostril to be kept free from the scales and incrustations produced at the orifice by the desiccation of the mucus that falls upon the very margin of the nostrils, and sometimes forms tampons or plugs running far back into the cavities of the head? It is well if he will do all these things; but experience, the best of teachers, will show him that such remedies have little power over the disorder, and that the coryza goes on notwithstanding all his attempts. Will he produce a useful therapeutical impression upon the mucous passages by touching them with a delicate camel's-hair pencil, dipped in proper solutions of nitrate of silver or other metallic salts? Even these things fail, and often fail, but there is a treatment which experience, the best of teachers, has taught me never fails. I scarcely dare, in a formal work, pretending to a character of science, to say what this treatment is, and yet I must, with undoubting confidence recommend the Student to adopt it.

When a new-born child is seized with a coryza that attracts my attention, I invariably direct a skull-cap made of flannel, to be so constructed as accurately and perfectly to fit the form of the cranium. I direct this cap to be fastened upon its head, and to be left there for three days and nights, and I always feel sure that within about that time the coryza will have totally disappeared. I mean to say that the cap should fit the head closely, not loosely, for I desire that the air of the apartment should not be allowed to touch the scalp.

If the Student will try my method and fail, he can but be disappointed, which, I am confident, he will not be; if he adopts all or any of the other remedies that I have hinted at above, he will surely meet with disappointment many times—by my method perhaps never.

It is hardly worth while to reason upon this subject, but let him read Dr. Denman's account of coryza, and the accounts contained in the treatises on the diseases of children, in order to learn how he can, in a better manner than that I have pointed out, and more effectually, counteract the pernicious existence and tendency of this troublesome malady.

CHAPTER XXIV.

CYANOSIS NEONATORUM.

In the month of November, 1832, during the prevalence of Asiatic cholera here, I had charge of the case of Mrs. Taylor, of North Fourth Street, No. 503. She was seized with symptoms of the epidemic, being at the time about seven and a half months advanced in her gestation. The attack was violent, and led to the premature expulsion of the child, which was born living, though very feeble. It soon began to turn blue, in consequence of its being affected with cyanosis, commonly at that time called blue disease, and as its hue grew darker and darker, its lessening respiration, and the coming on of convulsions, caused me to think it could not long survive; indeed, it came apparently to the point of death.

The young mother, who was still ill with her cholera, could not be insensible to the danger of the child, and I perceived that the complication of a moral shock with her other irritations, might render the cure of her own malady more difficult, if not impossible. It became, then, in view of the mother's position, a matter of great moment to rescue the child from apparently imminent death. These reflections, which I made at the time, gave me great pain; for while I deemed the state of the child one of partial asphyxia from the mixture of its venous with its arterial blood, the mixture being made by injection through the foramen ovale of the auricular septum, I could devise no treatment upon which to rely for obviating that injection.

I was deeply concerned, and knew not what to do. Suddenly, I reflected upon the structure of the fœtal heart, and the route of the fœtal circulation, and I said, if I bring the septum auricularum into a horizontal position, will not the blood in the left auricle press the valve of Botalli down upon the foramen ovale, and thus save the child, by compelling all the blood of the right auricle to pass by the iter ad ventriculum, and so to the lungs, to be aërated?

Having practised Midwifery for many years, I had, on many occasions, witnessed the fatal termination of cyanosis neonatorum, both in the premature and the mature child. I had seen children at five, and at five and a half, at six, and at seven months, vainly attempting to carry on respiratory life, and observed them to perish with the signs of cyanosis, whether from too large a foramen ovale, or from imperfect development of the respiratory machinery of the lungs from atelectasis.

In the case now under consideration, I placed the child, which seemed nearly dead, upon a pillow, on its right side, the head and trunk being inclined upwards about twenty or thirty degrees.

Upon placing it down in this manner it became quiet—began to breathe more naturally; to acquire a better hue of the face, hands, and feet; until, in a very short time, it was quite well again, and did well, having no further returns of the attack of cyanosis neonati.

I shall not conceal the satisfaction I derived from the successful result of my reflections, thus put into practice in the case; for I thought, and I still think, that the child would have died inevitably, had I not thus closed the valve. In very many instances, during a long obstetric experience, I had never made such a reflection upon the means of saving the blue child, of which I had seen many cut off. I believed, and I still believe, that I was the first to invent the treatment; and the first case in which I put it in practice, was thus eminently successful. I am not now aware that any other person had before suggested it, though in his account of cyanosis, M. Gintrac gives, in case 5th, an account of Dr. Wm. Hunter's patient, æt. 8, who obtained relief from a paroxysm, by lying still upon his *left* side, which always relieved him. After his death, the ventricular septum was found to be wanting, or rather perforated near the base of the heart, so that the aorta received the injection of the right, as well as of the left ventricle.—Vide *Gintrac*, p. 33.

Six years later, in my *Philad. Pract. of Mid.*, edit. 1838, I published some remarks on cyanosis, or blue disease, which being written in much haste, I did not at the time remember the circumstances of the above case, which occurred in Nov. 1832, in Fourth Street above Poplar, No. 503, in a child of Mr. Taylor, a builder, formerly of this city.

Since the date of my first application of this method, twenty-four years ago, I have had numerous occasions to put it in practice, and not a few opportunities of examining the state of the heart after death; in some of which, after vainly applying the treatment, I had come to the conclusion that other causes, not patency of the foramen ovale, must exist, to contravene the curative tendency of the method.

My publications—and my explanations to friends—with the lectures on the subject that I have now delivered to many hundred Students of Medicine, have rendered this treatment of mine a popular one—to such an extent that in various States of the Union, the treatment is become familiar to the profession. Many monthly nurses have become acquainted with it, and I presume it is so divulgated throughout the land, that children suffering from the malady will very generally have the advantage of its application, if it be really advantageous, and this the more probably, since no reasonable objection can be found to the putting of it in practice.

I make these remarks, founding them upon letters I have received from gentlemen in the different States of the Union; from conversations, and from statements made to me by Medical Students on their arrival here, in the autumn, of cases treated by their instructors.

This explanation will show that I am warranted to say, that my invention has become extensively known, and is to a considerable extent understood and practised in this country; the more especially as it has been reported by many hundred Medical Students, that are now settled in the North, the South, the East, and the West.

The following is extracted from a letter to me dated Pittsburg, Dec. 7, 1838, from Dr. W. F. Irwin.

Case.—"The second item of information derived from your work is that in which you lay down the only rational explanation and mode of treatment for that formidable disease of infants, called 'morbus cœruleus.' During a practice of twenty-five years, I have had about twelve cases. In one family I lost two cases in succession, with an interval of two years. In this family there appeared to be a singular tendency to the disease. From the mother's account, I should conclude that out of six deaths in her family, five must have died of morbus cœruleus. In deference to authority, I have generally pursued the plan recommended by the late Dr. Hosack, which may be seen in the Appendix to *Thomas's Practice;* and I must say that I was never satisfied with it, as it appeared to me to have no sort of adaptation to the then received pathology of the disease. In some cases, I have thought that a tepid salt-bath produced a beneficial change in the color of the skin, and in the respiration. In two cases, a tablespoonful of blood drawn from the cord seemed to have a good effect. In a case that occurred in August last—the child, which had been well for five or six days, suddenly changed color—had laborious and interrupted respiration at long intervals. I was sent for immediately, and ordered a warm salt-bath, in which the change of color from blue to the healthy tint was remarkably rapid. The attending physician came into the room while

I was engaged, gave some powders, and the infant died. In October last, I had a strongly-marked case in the afternoon at about six o'clock. As soon as the nurse announced the condition of the child, I had the washing suspended, and ordered the child to be placed on its right side, and to be left undisturbed until the following morning. At my visit next day, I found the infant healthy in every particular, and it has continued so until the present time. I have been so pleased with what I deem your philosophical mode of treatment, and its success in the above case, that I could not refrain from communicating the result."

On the 22d September, 1856, I superintended the birth of a well grown male child at term. It was badly cyanosed from the moment of its birth. The cyanosis did not arise from atelectasis of the lungs, for the infant cried aloud. It depended on open foramen ovale. I placed it on the right side, and it was left so for seven hours. When laid down it was blue as indigo; and when taken up was perfectly well, and is so now, which is Sept. 26th.

CASE.—I have before me a letter from Paul F. Eve, M. D., then Prof. of Surgery in the Medical College of Georgia, dated Augusta, Feb. 2, 1848. In this letter, Dr. Eve informs me that he was in attendance 22d Nov., 1847, upon Mrs. C., then affected with premature labor of an uncertain date of gestation. The child, a male, which was born after an easy travail, weighed between five and a half and six pounds. The testes were not yet in the scrotum. The respiration was at first carried on by sighs repeated once in five minutes. The child was once supposed to be dead, and given up as lost; but by breathing into the lungs it revived; and then, upon being laid upon its right side, where it was kept during four days, it perfectly recovered, and was healthy at the date of the letter. It was not dressed for three days. Every motion, for some time after its birth, would produce the cyanosis. Dr. Eve is inclined to believe it was six and a half months in the womb.

CASE.—Feb. 11, 1848. Mr. S. C.'s son, æt. 11 weeks. Very stout and healthy since his birth. Was vaccinated on the 3d instant, and has now a full-sized vesicle and areola; slept badly last night. This morning was much agitated and cried long—became blue as to the whole face—moaned for a long time. His mother supposed he "was going into a fit," and could not otherwise account for his strange appearance. (She has had six children.)

The child was crying when I arrived. The upper lip was very livid, and the countenance wore an air of distress. I laid it down upon its right side; it became quiet, and the livid areola vanished. I turned it on the left side, and the dark livor of the upper lip reappeared. Upon rolling it on the right side again the color disappeared, but returned when I replaced the infant on its left side. I gave it a teaspoonful of oil, with orders to lay it on the right side. Feb. 12th. Had a good night, and seems well to-day. In dressing it, the mother says, it became livid. She observed that it was on the left side, but upon turning it on the right it recovered, and has been well ever since. Jan. 3d, 1849, I believe this child has had no indisposition since the foregoing date.

CASE.—In March, 1848, I attended Mrs. G. T——, who was at the time delivered of a child at six months and ten days. It was deeply cyanosed for four days after its birth. The nurse kept it almost wholly reclined on its right side, and the infant, now about nine months old, presents a good prospect of a successful rearing of it. In this case, the child was certainly relieved when laid upon the right side.

CASE.—In the early part of the year 1848, I delivered Mrs.———, Thirteenth Street, of a fœtus at six months. It breathed well at first, and uttered loud cries. But cyanosis came on the third day. I many times caused the livor to disappear by turning it on the right side, and made it return by rolling the child gently over to the left side, and *vice versâ*, as often as I repeated the experiment. It died after some days. The foramen ovale was slightly open, and the lungs were partially affected with atelectasis.

Here is another letter, dated Antrim, Alleghany County, Penn., Feb. 11, 1848, which was addressed to me by Dr. S. Schreiner, a graduate of the Jefferson Medical College.

CASE.—"Mrs. A. S——r was delivered on Tuesday, Jan. 11, 1848, at 7 P. M., of a male infant. Nothing peculiar transpired during the gestation or delivery. Parents healthy; mother quite lusty. Supposed weight of the child about eight pounds; it seemed of full age, healthy, and well to do. About 9 P. M., it seemed to have a violent attack of colic; cried violently. All attempts to pacify it were vain, until about midnight, when it became quiet, and was laid in bed behind the mother, where it remained until about 8 A. M. on Wednesday. At that time the mother awoke, and thinking it breathed strangely, asked the nurse to take it up, to see what was the matter. She did so, and observed that it was of a dark-purple hue; the breathing seemed to cease; it was strongly convulsed, the fingers being clenched firmly against the palms of the hands."

Dr. S. informs me that the child was now removed from the lying-in chamber in order that the mother, after she had been told it was dying, might not witness its last agony.

"Upon remaining so for some time, it gasped for breath, the purple discoloration faded from it, and the paroxysm was over. It remained quiet, without any motion whatever for about three hours, when the fit returned again; and again it did so, each paroxysm continuing longer and increasing in intensity until Thursday (the following day), between four and five P. M., at which time I first saw it. During this time it had seventeen attacks, the duration of the last one being over forty minutes. The attacks returned at intervals of a little more than an hour.

"Its appearance, when first seen, was as follows: It laid motionless upon a pillow in the nurse's arms: pulse irritable; cheeks suffused with a scarlet flush; respiration short and quick (it seemed as if fever was present); dusky color of the skin, except the bright spot on the cheeks. Soon its face, then its body and limbs, became of a dark purple or nearly black color; respiration, a short gasp at long intervals, gradually increasing until it was altogether suspended for twenty minutes; pulse grew fainter and fainter, until it ceased at the wrist, and the heart only gave a heavy throb at long intervals. Gradually, the pulse became (again) perceptible at the wrist—the discoloration vanished, and the paroxysm was over.

"Though the parents and all present declared there was no use in attempting anything for its relief, they consented that a trial should be made. I had it laid in the position recommended by you in your course of lectures, and in your *Phil. Prac. of Mid.*, upon the right side, at an angle of 30°, enjoining strict adherence to the position.

"From its flushed appearance, and the congestion seemingly present, I should have recommended leeches, had they been at command. I remained long enough for another paroxysm to have taken place, judging from the previous intervals, but it did not take place. During this time it attempted to cry, but made no sound whatever, though it seemed to cry violently. After this it passed some meconium, and took a little milk and water which it sucked from a rag placed in its mouth. I was told these were the first motions of the kind it had made for twenty-four hours. They had before poured some nourishment down its throat, but it appeared to bring on a fit, and they desisted. I saw it again the next morning. It had two returns of the disease: so very slight, however, as only to be observed by the face becoming darker; but they continued only a few minutes. I should not forget to mention that, after each of these, perspiration ensued; slight attacks first, but after the second very copious.

"Pulse at this time appeared normal; respiration easy, but somewhat quick. I saw it again to-day. Has had no return of the paroxysm, and is in excellent health, with the exception of an occasional attack of colic."

I beg the Student here to reflect upon the nature of the fœtal circulation, and remember that it tends to undergo a constant change, from an early period of embryonal existence up to the time of the complete uterine development. For example, in the commencement, the embryon has no lung at all, and of course, all the blood of the right or pulmonic heart, passes over to the left or systemic heart, by means either of the foramen ovale or the ductus arteriosus. In proportion as the child approaches its viable age, its lungs become more and more fitted for their breathing office, and the pulmonary artery and veins acquire power to transfer larger and still larger quantities of blood through the lungs. As the pulmonary artery increases in power, the ductus arteriosus grows less, so as to be ready to transfer the whole of the work to the pulmonary artery as soon as the fœtal lung, freed by the act of respiration from its fœtal atelectasis, is also liberated from what might be perhaps properly denominated its atelectasis of pulmonary vessels, or vascular atelectasis.

Previous to its birth, the lungs of the child are solid—or rather the air-tubes of them are in a collapsed state—but, the descent of the diaphragm, and the expansion of the lungs, opens all those air-tubes to the atmosphere, down to their lowest cell. In the same manner, the pulmonary artery, with its branches, is at the same moment set free from its *quasi* collapse or atelectasis; and the blood of the right ventricle finds an easy escape by the pulmonary circulation; whereas, a major part of that blood had, antecedently, been accustomed to flow off by the ductus arteriosus.

The blood of the right ventricle, in taking its new route to the lungs, does so, by virtue of a sudden increase of the diastolic power. Previously to the establishment of respiration, the ventricle could be said to expand for only one-half of the sum of the pulmonic circulation, since the foramen ovale had always, before, carried its moiety of the blood into the left auricle. The right auricle was, from the beginning, fully expanded in diastole; not so as to the right ventricle. It is a curious fact that, though the auricle was *ab origine* in full possession of diastolic power, the pulmonary artery, capillaries, and veins—as well as the pulmonic, ventricle, were left in a state of partial atelectasis, from which they could be delivered only by the act of respiration, which at the same instant put an end to the fœtal atelectasis pulmonum.

This sudden expansion of the thorax serves as the means of instantly converting the fœtal characteristics into those of the respiring mammal; and when the conversion is plenary, or complete, the function may be said to be established.

It often happens, however, that instead of this complete establishment of the circulation, it is only partially effected, and the child fails to acquire the bright or florid tint that results from a full and perfect aëration of its blood. It remains in a torpid condition, and the hue of its skin is, perhaps, only less livid than it was when it depended for its aëration upon the placenta alone.

Many causes may serve to bring about this failure in the conversion. All those that act in such a way as to compel the blood, in part, to pass, as before birth, through the foramen ovale, can be cured by any method that shall be able to close the valve of the foramen ovale; and this is evident, because if the foramen ovale be shut by its valve, all the blood of the right auricle must pass beneath the tricuspid valves, and so by the right ventricle and pulmonary artery, to be aërated in the lungs.

The publications I have in various ways made of this doctrine have had the effect to institute far and wide in the land the knowledge of the method which I discovered, and which I humbly here claim to be my own. I do not believe that any physician ever thought of it or put it in practice before that occasion, which I have mentioned at page 727, to wit, in November, 1832. I look upon it as an important discovery, which, I have no doubt, has already saved, and will in future save many lives that could not by any other means be preserved.

Many persons have asserted that my explanation is erroneous, and that the lift of the valve of Botalli is not the cause of cyanosis, but that stricture or contraction of the orifice of the pulmonary artery is the cause, and that when the pulmonary artery cannot deliver with sufficient rapidity what it receives, the current is backed on the venous system, and so gives rise to the cyanotic hue and the other symptoms.

After carefully weighing these objections to my rationale, I am compelled to reject them, and hold fast to my own, not, I trust, from pride of opinion, or a wish to arrogate a vain and undeserved merit as a discoverer, but because I find, in my own rationale, encouragement to apply my method, while the other rationale gives no such encouragement, and does not, indeed, offer a suggestion of treatment, but leaves us where we were before November, 1832.

I shall here set forth many other reasons that compel me to adhere to the views I have long maintained, and—

1. If the foramen ovale could remain after parturition of the same size as before the birth, the orifice of the pulmonary artery would also retain its embryonal or fœtal diameter. Indeed, the pulmonic ventricle would continue in its state of partial *ante partum atelectasis;* for nobody, I think, will pretend that the heart dilates to compel the blood to enter as by a suction power, or exhaust-power. It is always dilated by the blood forced into it and distending its walls. But if half the blood flows off by the foramen ovale, it cannot receive, with the remainder, a quantity sufficient to compel a full diastole.

2. This condition serves to keep the foramen ovale open, the edge of the valve being driven off to the left by the stream.

3. If the valve be now shut down, the ventricle must yield, and make a complete diastole. Its contraction driving its contents through the orifice of the pulmonary artery serves as a dilator, and the stricture vanishes, sooner or later, under this dilating force. To shut down Botalli's valve, then, is to open the ventricle and its pulmonic orifice, while to constringe either the ventricle or the orifice is to lift the valve.

4. The difference between me and my objectors is simply this, that according to them, the pulmonic constriction causes the cyanosis, but the lift of the valve allows the constriction, according to my view.

5. In the cases I have cited at pp. 727 to 733, I have shown that my explanation gives a foundation of a successful method; and I am convinced that many hundreds of lives have already been preserved by it. If this be true, then, it ought to sustain my position, since so many children have been at once and completely rescued by closing the valve. If they were rescued, it could only be by the closure of the valve; and even if the cyanosis arose from the want of expansion of the ventricle, or of its pulmonic aperture, the close of the valve completed that expansion and cured the patients.

6. My objectors seem almost to lose sight of Botalli's valve in this discussion, and forget that it is a reality, and must have the function to close the foramen. Either it does this or it does nothing. If it does this in order to establish the pulmonary circulation, but sometimes fails to do its office, let us help it, or compel it to do its duty, by laying the child on the side to shut the valve down.

The disorder produced by these accidents used to be called *morbus cœruleus*, or blue disease, now known as cyanosis. Let us inquire what is the real nature of this cyanosis, and the causes why it produces its peculiar symptoms.

The blood is either venous or arterial, or, as Bichat denominates it, black or red blood. The red blood of the arteries is transferred to the veins by the channels of the capillaries. It is in traversing the capillaries that the red blood deposits its oxygen, and so, when arrived on the venous segment of the circle, has become black. The capillaries may be regarded then as a sort of strainers or filters, whose office, in part, it is, to take oxygen out of the blood for the service of the tissues. Whenever the tissues are capable of taking oxygen from the capillary blood, the tissues in which capillaries exist have their normal hue or coloration; but if there be none, or an insufficient supply of oxygen, they become livid. Cyanosis, therefore, is not due to any backing of the venous circulation by a check received at the orifice of the pulmonary artery. Such backing would produce engorgement of a red, not of a cyanose hue. Cyanosis is black blood from want of aëration in the lungs, and not from backing of the current. Rokitanski is in error in maintaining his view of the backing up of the blood.

I maintain that cyanosis, as a disease, is essentially of the same nature as asphyxia.

But the question now recurs, as to what is asphyxia. In my opinion asphyxia, essentially considered, is black blood in the capillaries of the brain. Some physicians insist that asphyxia is black blood in the lungs. The lungs always contain black blood, which is reddened in the lung-capillaries; therefore I contend that asphyxia is black blood in the brain. Asphyxia is a state of the brain in which that organ cannot extricate, or give out the life-force—the innervative force—the stream or current of nervous force—the biotic force—and I contend that it fails to do so, for want of oxygen to react upon the neurine. Cyanosis is the sign of the presence within the brain-capillaries of non-oxygeniferous blood, which is dark or purple or black blood, as Bichat calls it. The purple, or dark hue of cyanosis, is caused by the presence of black blood only in the capillaries. But, when this dark hue of the cutaneous capillaries is seen, it is evidence of a similar hue of all the capillary blood, whether in the abdominal, the thoracic, or the cephalic cavities and organs. This purple state of the blood is not fatal, except it exist in the brain, whose power it suspends. If it be chased out of the brain, by oxygeniferous streams of arterial blood, all the organs and tissues that lie under the control and domination of the nervous system, immediately recover their power. If the brain dies, they all perish in its fall. If a man die, therefore, with asphyxia, he dies because he has black blood in the brain, not because he has it in his leg or arm or skin.

A man may die from fainting, or lypothymia; and in this case he loses life, because the action of the brain is suspended. The suspension, in this instance, appears to me to depend upon lessened tension of the encephalic mass from the sudden withdrawal of a portion of the blood that ordinarily distends its vessels, as in sudden violent hemorrhage, in certain pathemata mentis, sudden changes of posture, &c. &c.; it is an anæmia of the brain.

Asphyxia is lessened or suspended somatic innervation from privation of the oxygen-reagent. Fainting is a similar suspension from reduced tension and pressure, or anæmia of the brain; either may be fatal; but each requires its appropriate treatment, which is different in each case. In a certain sense, therefore, fainting is asphyxia, or soon leads to it.

Asphyxia is not a status of the trunk or members; it is a status of the brain, and only of the brain. The livid hue is a result, or an accidence of the asphyxia.

If the vessels of the brain be injected by the carotids and vertebrals with carboniferous blood, the intellectual or perceptive, and the co-ordinating and motion-giving brains cease to do their office; if new injections fill these same vessels with oxygeniferous blood which chases out the former, the powers of the brain are reinstated, provided the mischief have not already gone too far.

A man etherized, or affected with chloroform, is, to a certain extent, asphyxiated, besides being poisoned; the same is true of him as of the well-digger, who descends into a well containing carbonic acid gas. The man in the well dies, not because his glottis is closed by spasm, as has been asserted, but because there is no oxygen in the well to be carried to the brain. It is indifferent to him whether his glottis be shut or open, since there is nothing to enter in that can do him good or harm; he dies from want of oxygen; and it may be, that the carbonic acid, if it enter his lungs, may do some mischief there; an indifferent mischief in the greater mischief.

I said that asphyxia is black blood in the brain—not in the sinuses and veins of the brain, but in the capillary part of the vascular system of the brain.

The greater part of the whole sum of the blood, variously computed to be about thirty pounds, exists in the systemic part of the vascular circle. Only a small portion of it is in the venous side. In the lungs, for example, where the pulmonary artery is a vein, and the pulmonary veins arteries, there is a great excess of the aërated, over the quantity of carboniferous blood, for not only is the capillary system full, but the venous system is full. But the carboniferous blood of the femoral, of the iliac, of the portal vein, and the cava, produces no asphyxia; nor is it true that, in death from carbonic acid inspired in a well, the demise depends upon the presence of black blood in the trunk or members; it depends upon its presence in the brain, particularly the respiratory, oxygenating brain, whose pneumogastric branches, and all other sources of respiratory innervation, are suspended and cut off indeed, of their force, because their neurine is flooded with carboniferous blood in which there is no power to extricate the biotic force—the nervous force, or neurosity, as M. Cerise denominates it.

If it be true that there is a valve on the left side of the auricular septum, it must be that its purpose is to prevent regurgitation of the blood from left to right. It could have no other use or design.

Even in a case where greater power of the right auricle impels a portion of the black blood through the valved orifice, any resistance offered by the valve must *tend* to diminish or prevent the transit from right to left.

If in any such cases, the plane of the septum auricularum be rendered horizontal, by placing the child upon its right side, the blood of the left auricle must *tend* to close the aperture by pressing the valve down, and keeping it down. The blood has gravitation, and its law of gravitation is as rigorous in the auricle as it would be in a cup, or in the air. Its weight must shut the valve, or *tend* to shut it, if any valve exist. But, with a shut valve, all the blood of the auricle must pass to the right ventricle, and so to the lungs to be aërated. It cannot pass the lungs without becoming aërated if the nervous power is intact. But, if the blood becomes truly aërated, it becomes oxygeniferous, and, transferring the oxygen to the capillaries of the brain, will there extricate the biotic force in a normal manner. All the irregular and diseased innervations depending upon the antecedent carboniferous quality of the blood in the encephalic capillaries must vanish before the steady innervative streams that proceed from a healthy brain, duly supplied with its quantum of oxygen.

There are many of my medical brethren who deny that my explanation of cyanosis neonati is correct, or even philosophical; contending that cyanosis is a status of the lung, or of the vessels of the heart, bringing about a modality of the lung alone; or a backing of the blood into the whole venous side of the circle, and a detaining of it in the capillaries; while I aver that the condition of the lung, or of the trunk and members, is nothing in the category, or rather a mere accident, which relates, in fact, only to the state of the brain.

I am quite conscious that a man's opinion cannot determine the least of Nature's laws to operate this way or that; and St. Matthew tells us, "Neither shalt thou swear by thy head, because thou canst not make one hair white or black." While, therefore, one gentleman sees only in a contracted pulmonary artery, or in a transposition of vessels, a cause of cyanosis, I am not to expect that he will come over to my way of thinking, because I think thus or so, even had I the authority and power of the man of Pergamus, who ruled us for fifteen hundred years. I am, however, less concerned to witness the acceptation of my rationale, than the adoption of my precept. If they will turn the cyanosed neonatus upon its right side and shut down the auricular valve, I ought to be satisfied; and, indeed, my distinguished friend, Prof. Wood, recommends the practice, while he dispraises the principle upon which it is founded.

Nevertheless, I admit that I sincerely desire to find a reasonable acceptation of my rationale; less perhaps on account of its application to the undeniable self-demonstrating instances of blue disease, than to the treatment of certain obscure, and more questionable forms of the accident, which I shall now proceed to mention.

In order to explain my meaning more clearly, I shall relate cases that occurred to me a few years since, and upon which I put a construction that perhaps will not be admitted by those who oppose my rationale of cyanosis, either as to its mechanism or its real nature.

A lady had given birth to a child, apparently healthy. She was soon afterwards attacked with fever, which produced in her a series of distressing nervous symptoms. The young child, after many days, became indisposed with what seemed to be a bronchial catarrh, which was rebellious under the treatment. Dr. Bridges saw the child with me several times. It grew alarmingly ill. It was affected with a vast, troublesome collection of unexpectorated bronchial mucus, that threatened speedy suffocation by filling the air-tubes and trachea. Upon entering the apartment on one occasion, I found it in the arms of the monthly nurse, sorely oppressed and nearly insensible. It was dying—or rather, I deemed it dying.

My impression from inspecting the child was, that it was moribund; and I still believe that the condition was that of the moribund, and that its life could not have been protracted beyond one or two hours, but for remedies employed to rescue it.

After observing it for some time, and noticing a livid areola about its mouth, I took it from the nurse to inspect it more closely.

The precise processes of thought by which I arrived at a conclusive opinion, have now escaped me; but I was led to imagine that the whole of the phenomena ought to be referred to a state primary in the brain, and not to a state primary in the bronchial mucous-membrane. I supposed that the sources of innervation becoming modified by the presence of carboniferous blood in the brain-capillaries, the organs had suffered in consequence of the cessation or the irregular action of the administrative power.

Upon cutting, in a surgical operation, certain branches of the trifacial nerve, the eye becomes instantly inflamed. Dr. J. Warren says that, under etherization, the conjunctiva is often injected with blood. The same thing occurs in asthenic fevers. So, in any hindrance of the current of the pneumogastric nerve-force, the lung might likewise become the seat of consecutive disorder. I was convinced that the child's foramen ovale admitted its venous blood to the systemic side of the circle thus vitiating the life power of the nervous mass of the child. I turned it on its right side, and kept it there. In a few moments it was relieved, and in a very short time gave no further reason for alarm, or concern of mind. In fact, the right lateral decubitus cured it, and that right speedily. This is a fact.

In the month of January, 1846, I attended Mrs. H———, at the Indian Queen, South Fourth Street, in a confinement in which she gave birth to a healthy child.

As she was ill many days with a fever, I gave but little attention to the child. It was between two and three weeks old, when I was summoned to it by three rapidly repeated messages. I found it insensible; affected at intervals of one or two minutes with convulsions, in which the head rotated to the right in strong extension; the right arm, stiffened, was elevated as strongly as possible by spasmodic innervation of the deltoid and triceps, while the left arm, also stiffened, was pointed downwards and outwards. The inferior extremities were also affected with rigid spasm. The mouth was open, and could not be closed, but by force. The pulse was feeble, and the respiration low, except when troubled by the recurring spasm. Many persons surrounded the infant, which was lying on its back on a pillow, supported on the lap, and supposed to be nearly dead.

The child had been well but a short time before. The attack had been a sudden one.

Upon contemplating the infant, which had two or three attacks of this spasm or convulsion while I was looking on it, I reasoned with myself as to the probable cause. There was no assignable hygienic causation.

Its mouth was bluish, though not in a very marked degree.

I took the child on its pillow, and laid it on my knees, in order the better to inspect it. I reflected as follows: here is a faulty innervation of the muscles of the head, neck, arms, legs, and lower jaw: with suspended consciousness. Are the parts in fault, or is the brain in fault? Whence these irregular intromissions of nerve-force into the organs? Is the nervous mass imperfectly oxygenated because the child sends its carboniferous blood into the left auricle, and so to the brain? Let us try that point.

I laid it on its right side in the cradle, its trunk elevated at about 15°, and I said, "Leave it in this position until I return. Perhaps it will die very soon; but I have some reason to hope it may be saved, if you should not change its position. I shall be absent three hours. Do not venture to move it, until I come again." In the mean time while I remained, it changed its appearance speedily and visibly for the better; it had no return of the spasm. It fell into a calm sleep, and was perfectly well when it awoke. It required no further cure!

Was this a *post hoc*, and not a *propter hoc* cure? Who can say so? The treatment was reasoned beforehand, and the result looked for.

As well might it be said that every therapeutical cure by emetics, cathartics, or narcotics, or diuretics, is a *post hoc*, and not a *propter hoc* cure.

The blood in the auricle or ventricle is not exempt from the laws of matter; it gravitates as absolutely there as in a teacup, or in the air. When I lay a child upon its right side, gravitation of the blood is inevitable; and since the valve is as delicate as the arachnoid, and light as thistle-down, the smallest drop resting upon it could close, as the slightest force could open it.

In this case, I brought the plane of the septum auricularum to be a horizontal plane; I compelled the blood of the inferior cava to rise in a vertical current to the fossa ovalis, and thus lessened the power of Eustachi's valve, to direct it upon the fossa ovalis. When I shut the valve down by the weight of the superincumbent blood, all the blood of the right auricle passed through the iter ad ventriculum, in order to be breathed upon in the lungs. It is probable that half a dozen systoles of the heart had scarcely been effected, before the oxygeniferous streams had reached the neurine, and waking into orderly and healthful force, the before hebetized innervations of the child, all the dependent organisms and organs resumed their healthful movements and life-manifestations.

Nov. 20, 1847, I was called to the child of Mr. H——, in Pine Street below Eighth. This child, a female, was born in October, 1847, and was now six weeks old. Upon reaching the rendezvous, I was pained to find the infant dangerously ill with catarrho-pneumonia, so far advanced, that I informed its mother it was probably too late for me to do it any good service.

The bronchial tubes and the trachea were oppressed with a great quantity of mucus, which so obstructed the respiration, that the child coughed at *every* breath, which was very scant, *saccadée*, and repeated sixty or seventy times per minute. Percussion and auscultation of the chest—careful examination of the abdomen—inquiries into the rate of the pulsations, both by feeling the radial pulse, and by auscultation of the heart, led me to the painful expectation that my friends were about to suffer the loss of their daughter. I prescribed for it, under a diagnosis of catarrho-pneumonia. Some hours afterwards I repeated my visit. It was no better.

Upon taking the child, which was on a pillow, and resting it on my knees in order to see it better, I found it in great danger of suffocation. Every breath was that compound of coughing and crying, which I cannot describe, but which every physician has observed. Upon inspecting it, I observed a livid areola about the mouth. The feet were bluish, as well as the finger-nails. It is true that such blueness might depend, and did in part depend, on the saburral state of the pulmonary mucous membrane—smeared as it was with mucus, and the tubes partly filled up. But, as the attack has been sudden—too sudden to be conformable to the normal march of such maladies, I reflected that the fault might not be primary in the respiratory mucous membrane, or pulmonary texture, but rather in the brain, which had lost its power of maintaining the status sanitatis in the lungs. I deposited the infant on its side, as for the treatment of cyanosis neonati. It seems to me that the valve of Botalli instantly fell down upon the foramen ovale, and that the carotid and vertebral injections of the brain immediately began to be thoroughly oxygeniferous. The administrative nervous mass commenced anew its government of its provinces, and, in a short time, the symptoms of the disease had vanished; I found, in the morning of Nov. 21, that no further treatment was necessary. I cured the broncho-pneumonia by shutting Botalli's valve, just as I should cure a conjunctivitis, by restoring the integrity of the trifacial branch cut off in a surgical operation on the face, and the loss of whose innervative current might have determined the conjunctival inflammation.

The objectors do not deny that the fœtal circulation, up to the first act of respiration, is chiefly directed through the foramen ovale and the arterious duct, and that it is so indispensably, and only because the operculum is raised. They cannot deny that the aperture virtually exists after birth, even for many days—nay, in some; during a long lifetime.

To deny that the two symmetrical halves of the heart may act asymmetrically and asynchronously, is to deny an admitted truth. To deny the effect of such dissidence in time and force appears to me to be but a mere denial.

I had many years ago charge of the health of a young woman, who labored under frequent attacks of cyanosis. She was often threatened with sudden death. In the intervals she appeared to be in good health, earning her bread by the needle.

One day, while much indisposed, she sat up in bed, eating a dinner of codfish. She suddenly fell on her side dead, in her 28th year. I found a foramen ovale, into which I could put a swan-quill.

In the heart of the Archduke Joseph, the cyanosis had coincided all his life long with an open foramen ovale.—See *Gintrac*, p. 228.

If in my own heart there be an aperture as large as the end of my finger, it is indifferent to me in respect of my health, while the two auricles contract symmetrically. But if asymmetrically, then I am liable to sudden illness, or even sudden death. My patient probably flooded her medulla oblongata with carboniferous blood, and ceased to breathe in consequence of the annihilation of that peculiar force that is evolved from the medulla.

How often have we seen similar states of the system brought about in attacks of puerperal eclampsia?

In this disease, an impetuous sanguine circulation gives rise to unmeasured, I had almost said explosive, evolutions of biotic force. In eclampsia, the spasm and convulsion of the whole system, and particularly of the diaphragm, which often, during the paroxysm, makes aspirations of only three or four cubic inches of air, allow the carboniferous streams to overflow the encephalon. Under this want of aëration, the face gathers blackness apace—the protruded tongue is of a deep purple, and a true asphyxia intervenes to save the life of the patient; so that the sooner the blackness of the features and tongue come to assure us of the arrest of the cerebral excitation, the sooner is the patient to be extricated from her perilous predicament.

If the medulla oblongata be overwhelmed with black blood she dies; sometimes this is the case, and she dies outright, no trace of lesion being discoverable in the brain.

Here we have no good and reliable sources of medication, save those that serve most rapidly and powerfully to diminish the momentum of the sanguine circulation in the encephalon, of which venesection is to be before all others preferred.

A proper venesection, executed before the asphyxia is established, in general prevents that consummation, by substituting a state of deliquium for the otherwise inevitable asphyxia of the eclampsic paroxysm; a far less dangerous and more speedy way of escape: less dangerous, since the sanguine engorgements and retardations coincident with the cyanosed state of the brain in eclampsia, expose the sufferer to inconvenient effusions or extravasation.

As to the right lateral decubitus for the new-born child in cyanosis, no doubt rests on my mind, after multiplied experience since 1832, now twenty-four years. I am not disappointed by finding the treatment sometimes unsuccessful, because, when it is so, I can with confidence believe that failure to change the blood is effected through some other agency than that of an open and used foramen ovale.

In the son of Mr. A. B——, I detected the existence of cyanosis neonati, and relieved the child, but could not cure it by my method. A series of diseased innervations, bringing the whole constitution into ill-health, continued to manifest themselves, notwithstanding all the precautions I could devise, and I announced, long before the death of the infant, which lived for several months, in addition to an open foramen ovale, the existence of an aperture in the septum ventriculorum, which was verified by the examination of its heart after its decease.

In a similar manner I announced in Mr. J. B——'s child, an open foramen ovale, as the cause of convulsive attacks which led at last to an effusion within the encephalon with separation of the sutures, and evident fluctuation, which opinion was verified necroscopically.

Professor Wood will bear me witness of the sudden and marked and indubitable relief and cure of Mr. H. W——'s infant, apparently dying with cyanosis, when it was placed in position.

In the eldest son of Mr. S. B——, jun., the respirations were but four to the minute; the pulse was gone, and the child within two or three minutes of its death, nay, deemed by some to have breathed its last. The recovery was almost instantaneous.

The same is true of Mr. H. K——'s son, with the exception that the case was not so extreme; so also of Mr. Rich's child, Mr. J. W——'s, and many others.

I beg leave to refer again to the letter from Prof. Eve, at p. 730, reciting a case of cyanosis treated by him. A letter from Dr. Casey, of Hartford, Conn., informs me of a violent case successfully treated by the position. Dr. Hains, of this city, and many others, have succeeded in like manner. Prof. Charles A. Lee, of Geneva College, informs me that the treatment is well known in Western New York.

I can by no means adopt the views as to the essential nature of the malady, set forth in Prof. Wood's late work on the Practice of Physic. That author, like others, appears to me to have mistaken the symptom, to wit, *blue color* for the disease, which, as I have so often said, is essentially a failure of innervation from absence of oxygen in the brain. He doubts the causation as dependent on the mixture of the two kinds of blood in the heart.

I cannot understand that the leg or arm should suddenly die for want of oxygeniferous blood; and I cannot perceive how the constitution can live, if the nervous mass, which is the essential Ens, be dead or inert, as it certainly is when only the carbonized blood of the veins circulates in its capillary vessels. M. Gintrac himself, who originally made four kinds or species of cyanosis—of which the first consists of the *mélange du sang noir et du sang rouge*, and the second a *coloration bleue également constituée par ce mélange*—comes to the true conclusion at last, that, instead of four species, there is but one, although he calls that one two.

Prof. Rokitansky, in his *Patholog. Anatomy*, vol. ii. Part I. p. 510, gives an article on cyanosis, in which he treats at large of the various kinds of that affection, whether as depending on faulty development of the heart, or on causes extrinsical as to that organ. He says: "A distinction is generally drawn between an organic disease of the heart acquired in the later periods of life, occasioned by disease of the lung, and that form of cyanosis dependent upon congenital malformation of the organ. The latter is called cardiac cyanosis. It will appear that the essential cause and character of both are the same. Cyanosis occurring in cases of congenital malformation of the heart has been mostly attributed to the mixture of the two kinds of blood, or rather to the passage of the venous blood into the arteries either by way of the ventricles, or the auricles, or the vessels themselves; but, it has been common to refer this commingling of the currents and the accompanying symptom of cyanosis to deficiency as to the septa of the heart. We are of the opinion that cyanosis *always* depends, not upon the mixture of the two kinds of blood, which is in many cases problematical, and in some takes place in a directly opposite direction to what is supposed, but on the impeded reflux of the venous blood into the heart, and a consequent habitual, or, in some instances, intermittent engorgement of the venous and capillary systems; and that herein all the varieties of cyanosis, however differing as to their original and acquired abnormal conditions of the heart and lungs, coincide, and may without violence be classed together."

I shall not here reproduce all M. Rokitansky's arguments and state-

f facts ingeniously brought to the support of this doctrine. I
erely state that the opinions set forth in this chapter as to the
utive nature or accidental nature of those contractions of the
nary and other orifices of the heart, appear to me undeniable.
that it is always reasonably to be expected that an uncured attack
yanosis neonati will lead to a constriction of the pulmonary artery,
the free expansion of the pulmonary artery, after the first as-
s of the neonatus, leads to the abandonment of the ductus arte-
and its early conversion into a ligamentum teres.

uld this page be at some future day honored by the regard of
tinguished writer, the author would beg leave to direct his at-
to the events and phenomena that occur in those cases in which
en coagulation of blood fills the right auricle and ventricles with
ot that is moulded by the cavities which it fills. Many examples
to be met with of these coagulations, some of which prove instantly
others admit of the prolongation of an ineffectual struggle
uring a period of from one to twenty days, according to my
ical observation.

w in the instance of a cardiomorphous clot, as above proposed,
ood is most effectually detained in the venous side of the circle,
ore so than can be pretended of the intermittent forms of cyano-
of which M. Rokitansky speaks. Yet, as long as the patient continues to survive, he continues to thrust betwixt the outer superficies of the clot, or false polypus, and the inner walls of the auricle, tricuspid valve and ventricle, as well as the pulmonary artery, portions of blood that become thoroughly oxygenated in the lungs—for the respiratory effort is one of desperation—and the blood is probably charged to its very highest capacity with oxygen. It receives enough to maintain in the neurine the extrication of innervative force until the gradual augmentation of the clot cuts off the power of the circulation. In these cases the blue color, the cyanosis, the *blausucht*, is scarcely to be discovered, the patient being, on the contrary, ghastly pale and sunken. If this be a true representation, I am right in denying that cyanosis depends on *backing* the blood on to the venous segment; for such a heart-clot as I have seen, can obstruct the venous tide as effectually as a ligature cast around the cava and drawn almost tight could do.

If Prof. Rokitansky and Prof. Wood's views are just, then we ought to have in the case of the pre-enthanasial clot the most striking example of the cyanosed state, for, when the heart becomes thus tamponed with a cardiomorphous coagulum, the whole of the venous side of the circle is stopped, and the black blood backed into the capillaries. A small endocardial clot must have the same power to produce mechanical obstruction as contraction of the pulmonary artery; a large one is equivalent to a ligation of the cava.

I deny not that a constriction of the pulmonary artery may produce cyanosis. Whatever restricts the action of the venous heart must do so. Great collections of fluid in the thorax produce it. Pressure upon the heart from dropsy of the pericardium; extensive injuries of the lungs from tubercular degeneration; suppurations, and large vomicæ; cynanche-trachealis, or pseudo-membranous laryngitis; pneumothorax; atelectasis pulmonum; a host, indeed, of accidents and diseases that ruin or disable the respiratory machinery, may produce cyanosis. But of these I have not spoken. I confine my observations and my method to the persistent use of the foramen ovale after birth, a case in which the blood of the veins takes the course originally followed by that of the placenta.

There is no other treatment for cyanosis neonati than that I have suggested; at least, there is no other reasonable treatment. Venesection, emetics, purgatives, diuretics, soporifics, baths, counter-irritants, cannot cure it.

When cyanosis has introduced epiphenomenal affections they may be treated. These affections will be found to relate chiefly to a state of the pulmonary circulation and excretions.

In some instances, I have applied a large leech or two to the region of the heart, in order, haply, to assist in overcoming the pulmonary or cardiac engorgement, so apt to coincide with failure or disorder of the biotic power of the medulla oblongata. In general, however, when the malady has depended on the injection through Botalli's foramen, I have been content to place the infant in the proper position, and trust to that alone for the cure.

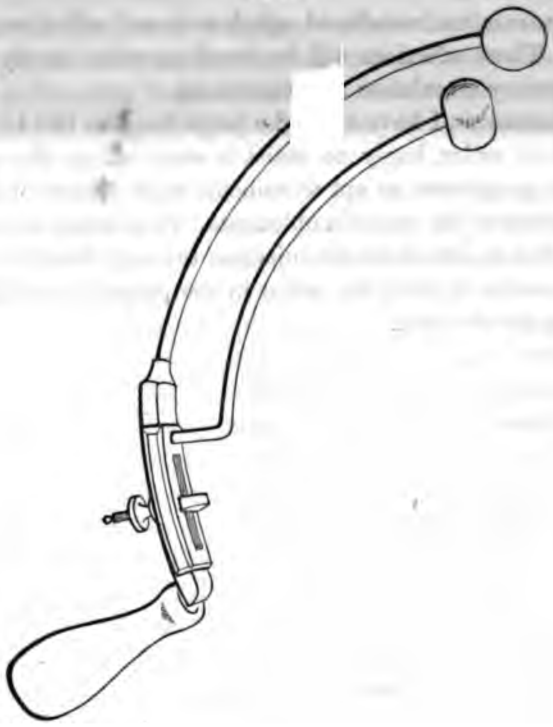
CHAPTER XXV.

SUPPLEMENTARY.

ing this volume, I wish to make the Student acquainted
arance and use of an instrument recently invented by
ry Bond, an eminent medical practitioner of this city, and
is designed for the purpose of restoring the womb to its proper
tion in cases of its retroversion.

instrument, of which I annex a figure, half size (Fig. 129), consists of two arcs of circles of different radii; the inner one is terminated by a small oval piece of ivory; the outer terminates in a small

Fig. 129.



ivory ball. The exterior arc is formed at its lower extremity into a plate-piece in which is a mortise. To the end of the plate-piece is attached an ivory handle, by which it may be conveniently held. (See the figure.) The inner or smaller piece is attached to a sliding-piece, also mortised, overlapping by its edges the mortised plate-piece, and secured by a clamp or pinch traversing the mortises, and fastened or loosened by turning the thumb-piece. If the thumb-piece be unscrewed, the clamp may be turned lengthwise, and the arcs are then easily separated.

In order to use the instrument, the arcs should first be separated and the ivory ball on the largest arc introduced into the rectum, while the oval one on the smaller arc should be introduced into the vagina.

By sliding the smaller arc upwards, the two balls can be placed opposite to each other; or the vaginal arc can be set a quarter of an inch, a half inch, or an inch lower down than the one that is in the rectum.

Upon being adjusted, and firmly secured by turning the thumb-piece, it is manifest that the two balls cannot be separated from each other, and that if they be moved upwards, parallel with the curve of the sacrum to the height of the promontorium, they must carry the retroverted uterus before them, and thus serve very effectually and easily to reposit the dislocated organ.

In a difficult case of retroversion, which I lately saw in consultation with Dr. Bond, I in vain made repeated attempts, in which I employed great perseverance and force, to get the retroverted fundus out of the peritoneal *cul-de-sac*, the bottom of which it had forced almost down to the vulva. In this case, Prof. Simpson's womb-sound could not be made use of, on account of the position of the os uteri, which was quite as high as, and close to, the top of the symphysis pubis, and so firmly pressed against it as with difficulty to admit of reaching the os tincæ with the indicator-finger. I could by no means succeed in several attempts that I made, to introduce the probe-point of Dr. Simpson's womb-sound into the os, for the canal of the cervix uteri made an acute angle with the posterior face of the symphysis pubis, and being in close contact with the top of the bone, it is clear that I could not introduce the end of the probe into it. I did bend the womb-sound near to its probe-point, so as to give it the shape of a blunt-hook, and, introducing the hook within the os uteri, endeavored to draw the vaginal cervix down the symphysis, but I could not make it move, and was obliged to abandon the attempt.

Upon the failure of these efforts, the caoutchouc bottles were made use of as pessaries, as recommended by M. Hervez de Chegoin, in the *Mém. de l'Acad. Roy. de Méd.* They doubtless served very usefully to effect a partial elevation of the fundus; in the mean time the engorged uterus, whose length could not have been much less than five inches, became gradually less hyperæmical, so that Dr. Bond was enabled, after three or four days, by means of the very ingenious instrument whose figure I have here given, to lift the fundus out of its dislocated position, whereupon the unfortunate lady was immediately relieved of a most distressing and painful accident.

A reviewer, in the January number of the *British and Foreign Quarterly*, treats Prof. Simpson, in my opinion, with uncalled for severity on account of his womb-sound, of which I have above spoken. There is little danger to be apprehended of mischief resulting from the use of that beautiful instrument in competent hands; and the facility with which an ordinary case of retroversio uteri may be relieved by it together with the absolute safeness of its application in the proper cases, are qualities so very valuable, and the whole operation is so much less disquieting to the fastidious patient, than the ordinary methods of treatment, that I think the profession should feel in the highest degree indebted to Dr. Simpson for his admirable invention. As to the uses of it in diagnosis, it appears to me, since I have become acquainted with it, that it is an indispensable article in the apparatus of the physician and surgeon.

At page 273 I described a case of retroversion healed by means of Braun's colpeurysis. On the 19th of the present month (September) I met the physician who consulted me on that case, and was informed by him that the lady is now and has been ever since the operation in fine health, and expects shortly to be confined.

I should have related the following most interesting case, in connection with what I said on rupture of the uterus on a preceding page; but having mislaid Dr. Bayne's letter, I insert it as a supplement. The courage and judgment displayed by Dr. Bayne on the occasion will be appreciated by every one who reads his relation of the event he describes.

Extracts from a letter, dated

PRINCE GEORGE COUNTY, MD., *July* 13, 1856.

PROFESSOR C. D. MEIGS—

MY DEAR SIR: I take the liberty to communicate to you the following case, which has recently occurred in my practice:—

About twenty days since, I was called to visit a patient who had been in labor two days. Found, on my arrival, there had been an entire cessation of uterine pain since the night previous; and on minute examination soon perceived that a rupture had taken place in the anterior and left side of the fundus of the uterus, sufficiently large for the escape of the entire fœtus, secundines, and about one pint of sero-sanguineous fluid in the peritoneal cavity. The fœtus was very large, and the rent very jagged and irregular. Inasmuch as we found it impracticable to deliver through the laceration and per vaginam, I proposed, as the only alternative, the Cæsarean section. The patient was then in coma; respiration very hurried, and pulse 130 per minute.

In the presence of three medical gentlemen, I proceeded to perform the operation in the usual way. In a very short time after the operation was completed, reaction came on, respiration improved, and coma passed off. No untoward symptom has supervened, and the case is most favorably progressing. The patient expresses herself as being able to resume her duties as cook.

Most respectfully, your ob't serv't,

JNO. H. BAYNE.

And now, that I have come to write the last paragraph of this volume, I take occasion to bid the Student God speed in his arduous path; to exhort him so to direct his course, that he may elevate himself to the highest rank of the Scholar-class, by which alone he can hope to reap the only and true reward of a life spent in the service of them that are in pain, in fear, or in danger of death. And lastly, I assure him that he can never learn too much of the opinions and experience of mankind, gained during the lapse of ages, on the subject of Disease and its Remedies. If he would, therefore, become a safe and useful minister in this art, let him never rest satisfied with clinical observation and experience alone, but let him devote daily a fair proportion of his time to the Medical Library.

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